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CHALLENGE OF THE ATOMIC AGE

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SCIENCE: A MODE OF THINKING

IT IS the purpose of this JOURNAL to reflect the thinking of our times on certain matters of general interest affecting education. In this biennium, following the end of a great war, we consider the challenge of living at peace with our neighbors. Previous issues have been devoted to consideration of the problems of world government, the functioning of such international organizations as UN and UNESCO, the force of propaganda and prejudice, and the role of educators and of women in the world today. In this issue, we consider the implications of a way of thinking. Applied science and applied scientific thinking made the last war a marvel of organization, technique, and achievement and any future war a horror to contemplate. Science and scientific thinking hold the germ of better living for everyone the world over if they are but given their place in the culture of a world at peace. The theme of this issue of the JOURNAL is the challenge of science to education in this atomic age.

The facts revealed by science and the method of scientific thinking have, until now, been revealed, actually, to only a few of the intellectually superior. As a new age dawns, it becomes evident that these facts and techniques must be a part of the common heritage of all men, of all children. To achieve such an objective of education, a re-evaluation of the curriculum from nursery school to adult education is necessary in the light of recent developments. Already some attention is being given to the place of science in the curriculum of the elementary schools, to the technique of developing and extending the curiosity of children about the physical world and making their observations more keen. Able teachers capitalize upon the fact that children are naturally curious about the world around them, but many teachers still lack the background of enriched knowledge about the physical universe to give them confidence in their procedures. As teachers with greater scientific training come into elementary classrooms, there will be an improvement in the quality of experiences and information available to children and the methods of presentation used. An improvement in the teaching of mathematics and the meaning and logic of the symbolism of quantitative measurement and thinking is also required in the early education of the student if he is to be prepared to do competent work in science on the secondary level. There is so much to know about the world that educators are failing in their responsibility to curious youth if they fail to teach the techniques of grasping what knowledge is available. Teachers with enriched experience in the realm of science and in its application motivate students to acquire the universal means of communication which open their way to universal experiences. At the far end of the educational spectrum, adults who have not had the opportunity of acquiring the point of view and the techniques of science in their earlier education must be provided opportunities for sharing in the culture of their time through an enriched program of adult education.

The scientific method is more than masses of facts or pyramids of techniques; it is a way of thinking, an approach to data, a means of arriving at valid judgments. In every classroom, in every subject-matter field, the student must learn to look at

his environment with open eyes and open mind. Science and the scientific method cannot be taught except in relation to problems. The student must learn to define the problem, to limit it, to determine the information needed, to study background materials, to select an appropriate method of procedure, to make observations, to collect and organize data, and to proceed to a conclusion which he is willing and able to accept and defend. The student who has formed the habit of scientific procedure in attacking social as well as physical problems tends to evaluate all judgments carefully. With a new respect for sound judgment, he is motivated to acquire the skills and techniques and information necessary to make dependable judgments in any chosen field of endeavor. Is this not the good citizen who can make democratic living effective?

The attention of the nation, of the world, has been focused on science because of the amazing developments achieved by the applications of science during the war. Laymen and educators are increasingly aware that comparable achievements can be brought about in a world at peace if science is but given a chance. The generation of students now in school must be given a *real* education in science. Many students of this generation will find careers in scientific fields, and they must be given the opportunity, via education, to learn the facts and methods of science, to apply the scientific way of thinking to an ever-expanding area of activities. Even students who do not go directly into scientific or technical fields will find more and more need for training in science if they are to be effective in the culture of their age.

It is the obligation of elementary and secondary schools to provide education suited to a scientific era. A National Science Foundation will soon be seeking talented youth to be given specialized opportunities in scientific fields. Professional and vocational or technical schools and all branches of higher education welcome students trained in the powerful mode of thinking fostered by competent education in science. A generation armed with the scientific point of view and willing to accept the challenge of creating a better world in which to live can achieve its dream of that better world, not in its physical manifestations alone but also in its social and political aspects.

SYLVIA VOPNI

"A reasonable content for general education today, then, seems to me to be as follows: First, a command of the principal linguistic tools essential to the pursuit of either science or art. Second, a familiarity with the scientific method and with its principal applications to both physical and social problems. And third, appreciation and practice of the arts, including literature. Furthermore, these three fields should be so integrated toward a common purpose that the question of their relative importance would not even arise. One does not ask which is the most important leg of a tripod."

GEORGE A. LUNDBERG
Can Science Save Us?
Longmans, Green and Co., New York, 1947

IS EDUCATION A TRADE OR A PROFESSION?

J. PAUL LEONARD

WE ARE, at present, in the midst of two important decisions in education: one relates to the nature of the people who shall teach our children, and the other is concerned with the content of the instructional program.

We have all become cognizant at last of the tremendous loss of teachers in the last few years. Business and industry have been taking teachers from the classrooms at a rapid pace. The schools of the nation have become dangerously staffed with people unqualified to meet the standard requirements of teaching. At the present time, one out of every five teachers in the elementary schools of our country holds credentials below those of the minimum requirements for successful teaching. The public disregard of this increasing problem over the last twenty-five years has helped to bring this situation to the present crisis. During the war period many opportunities were available to teachers, and at present the lag in salaries for qualified personnel in educational work has been a strong contributing factor to their remaining in other jobs. Another factor contributing to their not returning to the classroom is the lack of social prestige of the teaching profession.

But one of the most serious reasons for teachers' leaving the profession, and one which has not been stressed very often, is the nature of the profession itself. For a long time, the teacher has been considered an agent to see that the knowledge in books or courses of study prepared by someone else is presented effectively to the children in his care. In other words, the main concern of the teacher has not been about the materials of instruction but about the methods of instruction. He has not been a diagnostician, nor has he been an architect moulding human personalities in harmony with natural and environmental forces. Rather, has he been the technician, the tradesman, as it were, one who is chiefly responsible for seeing that the materials of instruction, as indicated by legislators, by members of boards of education, by well-meaning citizens, and by textbook writers, become the common property of all youth. The teacher has had little opportunity to do creative work or to undertake a really novel, experimental, and integrative job in education. There has been little opportunity or encouragement for the teacher to sit down and study the child, study his parents, study the environment in which he lives, study the issues of the day, and then to fashion creative educational experiences which will give youth an opportunity to grow and expand in terms of their own potentialities. In other words, the teacher might be compared to the old barber surgeon who had no fundamental understanding of anatomy, of health, of disease, of growth and development of the organism, but one

who was merely doing the job of letting blood, patching up wounds, cutting off appendages, or one of the various other sundry tasks which called forth little more than a mechanical skill.

If teaching is to continue to be this kind of a process, it will not only fail to attract to the profession youth with intelligence, ability, and fine personalities, but it will drive away from the profession those who are there already. If education is to become an important, worthwhile, challenging job to the kind of people that should teach our youth, then it must provide the kind of experiences which are more nearly compatible with the ideals, the abilities, and the principles which those young people hold for themselves.

Our children and the future of our society are too important to turn over to incompetent or untrained people. As the world becomes more complicated and the problems of life more serious, more education will be required on the part of the teacher. As education becomes more a development of attitudes, appreciations, and understandings, more skill will be needed by the teacher.

For years we have been guilty of putting into the classroom teachers who are only partially trained; even before the war, emergency teachers began to enter the schools. We placed teachers who had one, two, or three years of training, and then we expected to bring them up to some satisfactory standard by extension courses, curriculum programs, or supervision from the central office. Too often, we really did not expect them to keep up in their profession. After all, if education was only the transmission of knowledge and skills, there was not much need for working hard to keep up. The basic content remained much the same. At least, if it did change, the changes were taken care of in the textbooks. We need adequately trained teachers, teachers who will keep abreast of new and improved methods in their field and changes in the social, economic, and scientific conditions which must become a part of the content and experience of the school program.

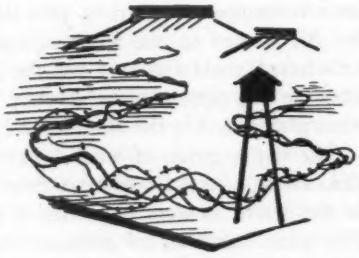
If education is to become a real profession, we must, first of all expect teachers to spend a minimum of five years in higher institutions of learning and teacher education institutions. During this period of training the prospective teacher should be a part of the classroom where children live as well as the classroom where theory and practice are discussed. Teachers should be adequately trained before they are licensed to teach. Then our credentialing system should be worked out so that we do not place a premium upon becoming out of date, but that we certify teachers periodically on the condition that they manifest that they have kept abreast of the important changes in the world as well as the profession. Such teachers must receive salaries commensurate with their abilities. When we do these things, and not before, can we make education a profession.

If we work upon marble, it will perish. If we work upon brass, time will efface it. If we rear temples, they will crumble to dust. But if we work upon men's immortal minds, if we imbue them with principles, we engrave on these tablets something which no time can efface and which will brighten and heighten to all eternity.

DANIEL WEBSTER

THE BOMB BEGINS THE ATOMIC AGE

J. HAROLD ANDERSON



THE OLD CAMINO REAL was a long and tenuous road, running north for hundreds of miles from Mexico City, across the Rio Grande at El Paso del Norte, through the JORNADA DEL MUERTO, the "journey of death," and on to Santa Fe, its northerly terminus. This outpost, the Holy City, became a permanent seat of Spanish and Christian culture. Years later came the BOSTON MEN from the East, and Santa Fe became the terminus of another road, the faint trace known as the Santa Fe Trail. Anglo civilization finally met with and became a part of the old Spanish culture, and years passed.

In 1943, Santa Fe once more became the terminus of a long trail. The Holy City became the mecca of technicians and scientists who, at Los Alamos in the nearby mountains, established one of the finest laboratories man has ever built. These men were the people of the Manhattan District, and the tenuous trail they traveled became a modern highway, riven through the rock of the unknown, a road to the new frontiers of the knowledge of matter. The release of the energy in matter by the use of nuclear fission was their goal. They succeeded; they learned how to release nuclear energy and how to control it at the same time.

As the men of Los Alamos and their colleagues in other places neared their goal at the end of months and years of labor, a party of them traveled back over the old CAMINO REAL to the place they named TRINITY. They did not remember that in the dim past the Conquistadores had prophetically named this place before them the JORNADA DEL MUERTO, the "journey of death." This place near the ancient Rio Grande in the range lands of southern New Mexico was now a part of the Alamogordo Bombing Range. Secretly they took with them the nuclear fission bomb, the "Atomic Bomb." Out in the desert they planned to perform their last experiment, to fire the bomb. They planned a new JORNADA DEL MUERTO, but they prayed that their new instrument of death might be a merciful one as is the scalpel of the surgeon.

When they arrived at TRINITY, the party found that the place had been prepared for them. Scores of men had worked long months in anticipation of this day and were now completing their task. First on the site, many months before, were the construction men, who, with the Army Engineers, laid out on the ground the works necessary for the test. A point named "Zero" was established, the point at which the bomb would be placed. Radiating from Zero Point were long straight roads, each terminating at a bomb shelter 10,000 yards away, about six miles. The

shelter at "South 10,000" was the control building, a hut built of reinforced concrete covered with a heavy blanket of protecting earth, open to the rear. Down the same road, and 7,000 yards farther away, or at a total distance of about ten miles from Zero, was the camp, a typical small Army village in a defiladed position.

The first inhabitants of TRINITY were soldiers, engineer troops, and a mounted military police unit. These picked men operated the camp and developed a perfect guard system. No person was allowed in or out of TRINITY without proper authority. Activity by the Counter Intelligence Corps in and around the site developed the information necessary to provide security in a larger sense. Proper liaison with the Air Forces on the bombing range provided a cloak and cover for the secret activities. Eternal vigilance and the use of imagination protected TRINITY against sabotage and espionage just as they had Los Alamos, Hanford, Oak Ridge, and the other places used by the Manhattan District.

One day a group of steel workers arrived from the East Coast, and erected, at Zero Point, a steel tower more than a hundred feet high. It was incongruous, alone in the desert, as were the miles of wire run in every direction over the vast plain. The wire, hundreds of miles of twisted telephone pairs, was to be used later in connecting and activating the myriad of instruments and control devices needed at the time of the test. The tower was to accommodate the bomb so it could be fired in the air. The antelope and coyotes were curious, but even this intense activity of man could not disturb them in that barren land. When the tower had been built and the wire had been installed, the steel workers and linemen departed from the site not knowing what they had wrought except that installations had been made according to precise plan.

The skilled workers were followed by technicians, the best the allied world could afford, men with strange instruments made for this experiment alone. They proposed to measure forces hitherto unknown to man; and with great skill they had manufactured, and were now installing, devices calculated to record the effects of the bomb, of the relentless forces of released nuclear energy. The miles of wire and the bombproof huts they fabricated there on the desert were a vast and intricate mechanism for control and measurement which covered scores of square miles.

The scientists began to arrive. In charge of the test project was Dr. Kenneth T. Bainbridge, of Harvard. Long hours, days, and weeks of preparation were spent at TRINITY by him, by Dr. Julian Mack, by Dr. John Williams, and by many others. They worked with Lt. Howard C. Bush, commanding officer of the site, and later with Brig. Gen. T. F. Farrell, Maj. Gen. L. R. Groves, and many of their commands. Those who came to TRINITY later included Dr. Enrico Fermi, the Italian physicist; Sir James Chadwick of England, whose studies of nuclear physics followed the great Rutherford; Dr. J. R. Oppenheimer, the Director at Los Alamos; Dr. James B. Conant of Harvard; and Dr. Vannever Bush, the chief of the Office of Scientific Research and Development. Dr. Richard Tolman, of California Institute of Technology, was adviser to the military in scientific matters, and Col. Stafford Warren, the soldier, advised and protected the scientists as a physician and radiologist. They worked together, soldiers and civilians, scientists and technicians, privates and generals, all in preparation for the party which would soon come to this place, JORNADA DEL MUERTO, with "the bomb."

The war was thundering and flaming abroad; American blood was staining the beaches of far seas; MacArthur and Eichelberger were planning the invasion of Nippon. Money, materials, and man hours needed by the Army and Navy had been diverted to the Manhattan District. In the last days at TRINITY the tension had increased tremendously; in one split second would be determined by experiment the success of failure of the colossal enterprise known as Manhattan District, and the time was near. Immutable orders had set a deadline. No time was lost. Some groups which were behind in preparation now worked night and day.

One of the last activities was a series of "dry runs" of the mechanism of control devices and instruments. The center of this activity was in the bombproof hut at "South 10,000," for here was located the principal timing and control device which looked like an old-fashioned music box, a revolving brass cylinder on which there were little lugs and indentations. A traveling arm, controlled by the irregularities on the cylinder, was tipped back and forth as it traveled. This arm served to switch in and out the various circuits of the "hookup" that spanned the site. For instance, the photographers had a camera of the types that exposes thousands of frames a second and can "stop" a bullet in flight, a camera which cannot be run any appreciable length of time because sufficient film cannot be supplied for it to do so, but the control device started the camera at the last instant so that it was in operation at the time of firing. This robot was fascinating; it operated just exactly forty-five seconds; it ticked like a metronome or a grandfather's clock. Because it controlled the whole experiment, one was persistently annoyed with the suggestion of a time bomb, a time bomb on a scale never known before except through the awful flashes that occur in the firmament.

On July 4, 1945, the people at TRINITY were nearly ready for the final test. Those not necessary to the carrying out of the experiment were leaving the site. The time for firing "the bomb" was finally set for the morning of July 16, 1945, at pre-dawn. At pre-dawn, cameras would function with no interference from the sunlight, and people in surrounding towns would be home and in their beds, not standing in front of plate glass windows or in other dangerous places. The nearest town was some fifty miles away.

The laboratory for the experiment was now prepared. The men at Santa Fe started out, back down the old CAMINO REAL to the South, and with them they brought the nuclear fission bomb to the JORNADA DEL MUERTO, to the place they had named TRINITY.

The bomb was carefully assembled and was installed on top of the steel tower secretly and with great precision. In the succeeding hours, every man was conscious of it there, persistently, warningly, naggingly conscious. It is the unknown which causes fear. As the sun set on the evening of the fifteenth, there came the realization that the long anticipated night was at hand. Last minute preparations were made; work previously finished was rechecked; procedure to follow was carefully rehearsed; all personnel was controlled as to movement; a period of necessary regimentation had set in. The few people who were to work in the bombproof huts moved to their assigned places, but most of the personnel on the site remained in the camp. Composure was impossible because of the expectation and the tension of waiting. One thought of Galileo's first look through his refracting telescope, of

the final proof by Madame Curie and her husband, of man's first flight in the air. Was this, too, a significant time in man's discovery and use of natural law? Failure this night would add knowledge to the scientists, for such is the scientific method, but every scientist prayed for success.

The meteorologists had forecast a clear night with good conditions for taking observations. But July is in the rainy season in southern New Mexico, and, as so often happens, a local thunderstorm developed in a few hours. It was determined later that the area all around the site had been clear of storms, but the site itself was covered with clouds, thunder, and driving rain. Keen disappointment was felt by everybody, but no order came except to stand by. As the night wore on, the clouds started to lift, and a star appeared. The ground was covered with pools and muddy rivulets. More stars appeared; the air cleared; only a high overcast remained after the storm. General Groves and Dr. Oppenheimer discussed the situation and decided to proceed. Conditions for making observations were not perfect, but a postponement of another day might cause the loss of hundreds of men in the Pacific Theatre. Word was sent out that the test would proceed at five-thirty. Further attention to the weather ceased; alert consideration of the matter at hand was resumed; and the last-minute preparations were finished.

At the camp, a ten-minute warning was given at five-twenty by the sounding of the siren on the ambulance. Everything was in readiness: windows had been removed from the buildings to prevent breakage by the shock wave, buildings had been vacated, and all normal camp activities ceased. At minus five minutes, the siren sounded for the last time, and everybody proceeded to the spot he had chosen for viewing the experiment. On the north side of the camp there was a stock tank, an excavation in the earth designed to catch drainage waters for watering cattle. Most of the people present were at the tank, at or near the earth parapet on the north. There was little talk. Each man had his own thoughts. Each peered to the north but could see nothing in the darkness. Each was much aware of the bomb, less than ten miles away, resting on top of the tower at Zero. A little FM radio receiver was in operation, loud enough so that everybody could hear it. Dr. S. K. Allison was operating a transmitter at "South 10,000," tolling off the time: "Minus four minutes, minus three minutes." When he announced, "Minus two minutes," each man prepared himself according to previous instructions; he lay prone in the mud, face down, with his feet towards Zero Point and with his eyes closed. The medical officer had warned all personnel against looking at the initial flash: to do so might cause blindness. Most took the added precaution of burying their faces in their folded arms to give their eyes all the protection possible.

Dr. Allison announced, "Minus one minute." Silence! "Minus forty-five seconds." As he spoke, every listener heard the robot start its ominous tick, tick. The final circuit had been closed; the experiment was now started; the vast mechanism of wire and instruments was in operation. The hand of man no longer controlled the powerful device he had wrought. Every listener could hear his own heart racing ahead of the robot. Dr. Allison's cool voice droned on, "Thirty, twenty-nine, twenty-eight." He reached minus ten seconds and continued, "Nine, eight, seven." Every man hugged the earth, unconscious of the mud, a primordial being fearful of what he had fabricated. He prayed silently. The tick, tick, tick of the robot beat on,

hammered to the core of one's consciousness until nothing else existed. "Four, three, two, one." "Now," Dr. Allison shouted. Every man saw the flash. Even with eyes tight shut and shielded by arms, they saw the flash, a flash in the silence of the chill dawn. The whole world stopped in awe. No light like this had ever been seen before. The brilliance was equal to numbers of midday suns. The light was seen 450 miles away by a pilot flying over Needles, California; in Albuquerque, 120 miles away, the dawn rose in the south that morning. Silently and in awe the men at TRINITY got up and peered over the parapet, looked north to Zero Point. Rising before them was an awful column of fire, exploding, pulsating, burning—white hot, so hot that they could feel the heat where they stood nearly ten miles away. There was complete silence. The column rose to a height of 40,000 feet, eight miles straight into the sky, but still connected to the earth. It started to die, and changed to the cooler reds and purples, magnificent, indescribable. They stood in silence, unbelieving. As the light disappeared, some forty seconds after the firing of the bomb, the sharp crack of a tremendous explosion was heard and thunder rolled along the mountains miles away, echoed and reechoed. The shock wave zipped by, a thing gone before it was felt. Then followed the release of dammed emotions, the return to reality, shouts of triumph, handshakes, prayers, tears; and one scientist prophetically said, "God help us; it worked." As realization came, one man suddenly remarked, "The Japs are licked." Everybody realized the significance of his statement; of course the Japs were defeated. No military power on earth could withstand the searing, hammering death which had just been demonstrated. A small group of men, standing in the mud at TRINITY, experienced the joy and relief of VJ Day some three weeks before that day finally came.

After the sun had risen, curious men looked towards Zero Point and were disappointed. They saw there a lake and feared that the rains of the night before had flowed into the crater. But investigation disclosed that what they had seen was not a lake of water; it was a lake of glass. The heat released by the bomb had actually fused the earth itself into glass. To this day, one may see at TRINITY, out at Zero, a shimmering turquoise lake, 2,400 feet in diameter, beautiful in the distance. But closer examination discloses that it is made up of repulsive, gray-green globules of glass, the only thing left after that sudden, lashing release of nuclear energy, a release of energy equal to that of an explosion of 20,000 tons of TNT.

TRINITY had once more become the JORNADA DEL MUERTO, the journey of death. Never again will the real and first name of the place be forgotten. Hiroshima and Nagasaki also, now, are stopping places on the JORNADA DEL MUERTO. The atomic age began with the bomb, with the journey of death, on July 16, 1945.

"Man is but a reed, the most feeble thing in nature, but he is a thinking reed. The entire universe need not arm itself to crush him. A vapor, a drop of water suffices to kill him. . . . All our dignity, then, consists of thought. By it we must elevate ourselves, and not by space and time which we cannot fill. Let us endeavor then to think well: that is the principle of morality. By space the universe encompasses and swallows me up like an atom; by thought I comprehend the world."

BLAISE PASCAL, "The Philosophers"

ATOMIC ENERGY: THE SUPREME CHALLENGE TO EDUCATION

THEODORE BRAMELD

ALTHOUGH atomic energy has been the most discussed subject in the world for the past year, it has not been discussed sufficiently. It will not be discussed sufficiently so long as it remains the tremendous threat to the very existence of civilization which it is today. In some ways, indeed, that threat is more dangerous than it was in the summer of 1945, when the first bomb exploded in Hiroshima, killing 100,000 men, women and children. It is more dangerous because, with every passing day, the power of atomic energy is found to be more overwhelming and the means by which it might be utilized to destroy the nerve centers of civilization in a few blows, more diabolically ingenious. Moreover, delay in determining clearly and unequivocally how atomic energy shall be controlled only invites an atomic armamenfs' race between nations—a race which, like previous armaments' races of history, would lead again not only to the wasteful, immoral use of resources that should have a constructive and moral use, but would result in fomenting more and more mutual suspicion and very probably end in unspeakably terrible violence.

I confess that, as a lay observer of international relations, I see the present picture as not one to generate optimism. On the contrary, if we attempt to weigh the negative and positive factors in the present world situation, we necessarily face the unpleasant fact of several profoundly disturbing aspects in international relations as well as in the internal status of certain nations.

I.

In the first place, the United Nations have clearly not offered any great assurance thus far that the long tradition of nationalism will now be supplanted by a genuinely international policy of effective cooperation. Despite the good beginnings in San Francisco, the meetings in Paris, for example, were characterized much more conspicuously by suspicion, tension, and downright hostility than they were by a spirit of trust, confidence, and constructive achievement.

Indeed, one cannot help recognizing a vicious circle at work in the relations particularly of the United States and the Soviet Union. These two nations have in many ways developed more and more unyielding rigidity and distrust as months have gone on. The most powerful organs of public opinion in the United States have engaged in attacking Russia's motives; it is as though they could scarcely wait for the last shot to be fired, closing World War II, before they were levelling their

own guns of propaganda. The resignation of Secretary of Commerce Wallace can mean only that the United States has chosen to continue a foreign policy which will create still more stubbornness and fear and still less flexibility in seeking means of conciliation. This is not to say that the Soviet Union may not be equally at fault: its attitude, particularly in the Far East, has been, to say the least, disturbing. Yet I do not see how any fair observer can fail to recognize that, in the attempt of the United States to retain the secret of the atomic bomb, we have revealed a stubbornness at least as disturbing. Each side, by its conduct, has tended to stimulate suspicion in the other.

Another important negative factor is the condition of the domestic economies. We are now passing through a period of "prosperity" very similar to that which followed World War I. Money is easy; jobs are plentiful; and there is very little evidence of the sort of over-all, long-range planning which would lead one to suppose that the capitalist countries are concerned about what lies ahead. I do not say that a depression is inevitable; on the contrary, I deeply hope that it may be avoided: should it come, we may be confident that by comparison the depression of the 'thirties will look like a children's tea-party. Yet I do not see how we can honestly deny that the spiral of economic development at the present time is such as to lead toward a very great danger of depression. Nor can we deny the strong possibility that, with depression, will come all the confusion, instability, and international tensions which are the fertile seeds of another war.

Finally, on the negative side I must, in common with many other American observers, report that the past year has been characterized less by efforts to find a workable solution to the threat of atomic energy than by blundering and vacillation. A group of high military officials, for example, attempted some months ago to force through Congress a bill which would have had the effect of keeping atomic energy secret under the exclusive control of the armed forces. Fortunately, this attempt was blocked by other citizens who did not choose to see the United States become what Plato called a timocracy, a state ruled by a military elite.

II.

Let us now consider one or two important positive factors. The most important, I believe, is the militancy of democratically-minded citizens like those just mentioned. I should be grossly misrepresenting my country should I lead you to suppose that there are not very strong forces who disapprove of the rigidity of our present foreign policy; who favour systematic planning of our economic life; and who wish atomic energy to be internationally and publicly controlled.

At the present time this positive factor, to be sure, is more largely expressed in tremendous concern than crystallized in achievement. A widely discussed essay, published in America under the title, *Modern Man is Obsolete,* points out that, with the explosion of the atomic bomb, some of the most comfortable traditions of modern civilization likewise exploded. National sovereignty, particularly, is as obsolete today as would be a system of production by handcrafts. People now use the term "one A.A." (atomic age) as a more accurate designation of the calendar than "1946 A.D." Never before in history, in all probability, have as many people at the same time so clearly agreed upon one fact: they know, and often far better than do dignitaries in places of pontifical authority, that unless we find ways this

time of guaranteeing peace, we are confronting our literal doom.

For these reasons and others, education should assume the greatest possible responsibility in coping with this vast problem. I do not mean to imply that education, as another positive factor of great importance, is in itself a sufficient solution. We have too frequently tended to drop our unsolved problems into a bottomless barrel vaguely labelled "education" and expected somehow a miraculous solution to emerge. Actually, education becomes a constructive force only when it vigorously cooperates with and is indigenous with the economic, political, socially creative forces of the culture: when it is of the very stuff of the growing, struggling life of every small and large community. Yet, however effective it can and should become, I would plead for a more modest judgment of the actual power of education. Paradoxically, we teachers, students, and parents become stronger as we estimate more accurately our limitations.

While the contributions that education, so evaluated, could make are many, in this discussion I shall confine myself to four suggestions. These suggestions deal with the role of science in education.

III.

The first takes us briefly, much too briefly to avoid superficiality, into the philosophy of science. By philosophy, I mean the examination and clarification of basic beliefs, assumptions, or premises. By the philosophy of science, I mean the study of these premises as, consciously or unconsciously, they underlie physics, chemistry, biology, psychology, and all other fields which come within the compass of experimental investigation.

Now the philosophy which has dominated our scientific thinking for a long time has suggested a picture of the world as a kind of great orderly machine operating according to an exact, quantitative process of cause and effect. Every part is related in a fixed manner to every other part, and the whole structure is governed by laws which are *already there* in nature. The role of the scientist, according to this philosophy, is roughly like that of a dexterous stage hand: his chief function is to pull back a curtain from nature, revealing on the stage of the universe the mechanical perfection of things in all their magnificent orderliness. The laws which govern this fixed universe are there to be observed, reflected by the mind, and scrupulously obeyed.

Within the past fifty or so years, however, a new philosophy of science has been developing. The motivation for it came from the work of great scientists like Einstein who, for the first time in centuries, dared to challenge the assumed finality of such laws of nature as Newton's law of gravitation, indeed the whole mechanistic conception of the universe which we associate with Newton. At the same time, scientists of philosophic bent began to develop a theory which now conceives the function of science, not primarily as a beholder of pre-existent laws and regularities, but rather as a manipulator. An American physicist, Bridgman, has given us the term *operationalism* to suggest this newer approach: science becomes a highly refined instrument for operating upon and cooperating with nature, of effecting adjustments and readjustments through which man may more effectively control nature.

You will see at once the educational implications of these two viewpoints. In America, at any rate, there is no doubt that the teaching of science, strongly influenced by the mechanistic philosophy, has tended to develop in the young an attitude of acquiescence, of passivity, of almost fatalistic subjection to overwhelming forces and laws. On the other hand the operational approach, which underlies the science teaching of our more progressive schools, develops the attitude that men can become the masters, rather than remain the servants, of nature. To paraphrase a famous dictum of one of our great nineteenth-century thinkers, the operational philosophy of science means, above all, that man makes science; science does not make man.

If we relate this second position to the chief issue before us, you will see, of course, that I am pleading for a kind of scientific teaching which encourages the conviction that atomic energy, far from being necessarily a force which will inevitably destroy us, is a means to increased cooperation between nature and man. Atomic energy can be used just as well for constructive as for destructive purposes. Unless our schools do their share to inculcate a universal conviction that we must control atomic energy rather than allow it to control us, they will have failed most seriously in their duty.

IV.

The second suggestion follows closely from the first. Scientists of all kinds should become more than scientists: they should become citizens deeply concerned for the social import of their achievements. Happily, the recent pronouncements of scientists engaged in atomic research are omens that this kind of concern is increasing. For example, 400 physicists working at Los Alamos, one of the centers of atomic research in America, publicly stated that unless a way is found, within a few months, to place atomic energy under public control, we may anticipate the destruction not only of other nations, but of our own as well.

It is not my intention here to plead for any modification of the scientist's integrity to the canons of research. I am saying, with the American thinker and poet, Archibald MacLeish, that unless the artist and scientist take an active part in the social struggles of our critical age they are irresponsible. Indeed, they are opening the way to the wrecking not only of economic and political institutions but of the very freedom which is essential to creative, scientific, and artistic achievement.

The kind of responsibility I mean is exemplified in a report to the American Secretary of State by a committee of scientists and citizens. The report recommends a plan for international control of atomic energy. I wish every student, young and old, would read that report and discuss it with others, and then decide whether to recommend endorsement to their respective governments. So far as I can determine as a layman, it is well worthy of your approval. I will summarize its most salient points.

First, the report rejects as inadequate any plan limited to inspection of atomic experimental centers of the several nations. It states that such inspection would fail to prevent subterfuge and suspicion. Second, the report rejects continued secrecy as a policy, for it recognizes that the principles of nuclear physics are already known throughout the world and therefore that almost any nation, given a little time, could, in all probability, succeed fairly well in duplicating the achieve-

ments of the United States. In fact, it is quite possible that other nations are already well on the way toward equalling or exceeding our investigations while we continue to debate the really absurd question of whether the secret should be revealed. Third, and more constructively, it is recommended that all "dangerous" experimentation (which is distinguishable to a considerable extent from "non-dangerous" experimentation) should be under the control of an international atomic energy authority in turn subject to the authority of the United Nations. All experimentation, moreover, should look to the constructive potentialities of atomic energy. Fourth, and by all odds the key proposal, is this: since in the foreseeable future atomic bombs can be made only with the use of two elements (thorium and uranium) and since the deposits of these elements are already largely known, therefore these deposits should come under the absolute control of the same international authority. If other deposits are discovered, they, too, should come under that control.

This report is then an example, at its best, of the social responsibility of science and of the inextricable relation of science and society.

V.

My third suggestion, emerging from the second, is that science in the schools be radically reorganized to place its vastly important methods and achievements in direct relation to the interests and problems of daily living.

The traditional teaching of physics, chemistry, and other sciences is usually very inadequate. The various fields of science have been taught as separate and compartmentalized bodies of knowledge without regard either for their relations to one another or for their relations to social and cultural experience.

The average student is not going to be a scientist, and the science he studies should be primarily, therefore, in the form of problems selected from his familiar environment and with constant concern for interrelationships of the natural sciences, the social sciences, and the arts.

May I illustrate? Recently I conducted an experiment in a small Minnesota high school, in which some fifty boys and girls, seventeen and eighteen years of age, spent nearly five months, two hours a day, five days a week, seeking an answer to the question, "If we had the power, what kind of blue-prints would we like to see drawn to guide us in the reconstruction of our culture?" In their search, these young Americans turned to the political thinker, to the economist, to the artist, to the educator, and to the scientist himself. Wherever they could get help, they drew upon the resources of these and still other fields. They asked the scientists, "What have you already discovered that would make people more healthy, that would make our cities more efficient and harmonious?" and so on. Rather to their surprise, they found a host of scientific achievements that have not thus far been utilized, partly because it is not always profitable to do so. Just one example: they found that science already knows fairly well how to heat houses practically by sunlight, a method that would revolutionize the heating systems now in use and would, at the same time, if properly studied, illustrate the operation of many basic principles of physics.

I am pleading, in short, for what we may call the functional teaching of science, a method which would obviously put into dynamic operation the second of the

two philosophies I have sketched. With regard to atomic energy itself, functional science would emphasize the constructive uses of such energy for curing disease, for generating power, perhaps for revolutionizing our entire technology. A study of atomic energy is an especially apt illustration, because it taps the direct interests of people everywhere. Fission, chain reaction, heavy nuclei, and light nuclei are marvelous avenues to teaching not less but more basic science. They are means by which science assumes significant meaning for the lives of ordinary people, in a world of infinite danger and equally infinite promise.

VI.

The fourth and final suggestion is that education should develop a new sense of purpose. I am sure that our culture has not clearly known its own direction and therefore the schools, which are indigenous to that culture, have not known either.

The confusion should be resolved. If the schools are to make a significant contribution toward solving the problem of atomic energy, they should help to answer the question, "What kind of a world do we really want?"

I think that the answer to this question is already, at least in outline, available. The kind of world that most of us want has at least two fundamental characteristics: First, the world we want must have an international order rather than a confusion of separate, competing states. If we are to have peace, we must realize that national sovereignty and international authority are incompatible: we simply cannot have our cake and eat it, too. We must subordinate national sovereignty to the interests of a world order with authority to enforce its decisions. If we do not, we must face the consequences of national rivalry and all the horrible concomitants of that rivalry. Second, the world we want will have to be controlled, in every sense of the word, by the great majority of the people who seek to agree upon their most fundamental interests.

We have paid lip service to these objectives for a long time, but we have never actually believed them, for conduct is always the real test of belief. The time to equate belief with conduct has now arrived. The common people of every race, every religion, and every nationality must have final control over the policies, the resources, and the key institutions of the world.

The significance of these two solutions of the problem of atomic energy is obvious. The only real hope of guaranteeing that atomic energy will be controlled in the interests of peace and abundance, rather than of war and scarcity, is in the twofold guarantee of international authority and majority rule.

These two, synthesized together, must become the guiding purpose of education in general and of science teaching in particular. To magnetize education by such a purpose and to implement that purpose by a philosophy of science grounded in the principles of operationalism will assure that education is equipped to meet its full share of responsibility in this moment of peril.

(An address delivered in Australia at the international education conference held under the auspices of the Federal Council of the New Educational Fellowship, which Professor Brameld attended as the American delegate.)

SCIENCE AND CONTEMPORARY EDUCATION

WALTER H. BARKAS

INTRODUCTION

THIS little article may be considered pretentious; I hope it is relevant to the central problems of the world today. When asked to write something on "The Challenge of Science to Education in the Atomic Age," I was not at all sure I had anything adequate to say. One Saturday morning, basking in the sun of the California desert, I, nevertheless, undertook to formulate the outlook I should like those to have who instruct my own children. The inquiry went a little further also to question what indeed is Science that it should "challenge" education, or otherwise guide the faltering footsteps of humanity in search of whatever it is seeking. My subsequent thoughts follow:

SCIENCE, KNOWLEDGE AND CULTURE

Science is engaged in putting together a vast jigsaw puzzle, the pieces of which are the facts of experience. The mural of Science grows and gains more significance as endless generations of men seek and find isolated fragments to add to the organized body of accumulated knowledge. Scientific knowledge differs from the raw data of daily experience only because it is organized and it is cumulative; once established, the information is never lost. Scientific organization of knowledge also involves the formulation of quantitative relationships and evolves generalizations by inductive processes.

New knowledge is increasing rapidly because knowledge is acquired somewhat in proportion to the amount already in existence. There is no indication that we are approaching any impenetrable boundary to knowledge, although principles have been adduced defining what is observable and what is fundamentally unobservable.

Science provides knowledge, and knowledge is power. Power may be used as well for evil as for good. Many now fear the further increase of knowledge because it gives ruthless men a greater capacity for doing harm. It is not my thought to deny this danger, but rather to emphasize it later. The accumulation of knowledge commenced thousands of years ago and has been accelerating ever since. It is idle to speak of reversing the trend, as Science is as much a part of the human spirit as is Religious Faith. Each modern man has a background of scientific culture, and he thinks in a scientific way, however imperfectly. Science belongs to all mankind. In the tradition of Science, there has never been any petty hoarding of knowledge, but scientists have always maintained a true international fraternity and have fostered the widest possible dissemination of scientific culture. Science is, therefore, not at all a mysterious thing apart, but the carefully formalized experience of many

[1] The opinions expressed in this article are those of the writer and should not be construed to reflect the policies of the Navy Department.

men; it is, indeed, the true and sound wisdom of the race, the glory and perhaps the sufficient *"raison d'être"* of mankind.

A Scientist is one who has undertaken the pious task of accumulating and organizing new knowledge and who is peculiarly fitted by training and bent for this occupation. Because the scope of human knowledge is so great, it is expedient and necessary to specialize, so that generally a man will know a good deal only about one or two segments of the whole of Science. In the words of Alexander Pope,

> "One Science only will one genius fit;
> So vast is art, so narrow human wit."

Within this field, the practicing Scientist is an expert in the methods and technics of research and is best able to grasp the significance of the information obtained. When the reproduction of neutrons in the process of uranium fission was observed, no one realized as well as the skilled workers who made the experiment what its implications were.

One finds empirically that nature is consistent, so that he can be confident that each new piece of information will fit into the jigsaw pattern and, moreover, that it will fit more precisely and supplement the existing body of knowledge better, the more carefully the observations are made.

Imagination and resourcefulness are necessary for the consummation of brilliant research, but theoretical science not closely tied to accurate observations is generally sterile, or at least merely academic. True research is the unhampered adventuring by the trained and disciplined imagination into domains not yet charted in human experience. Such activity cannot be regimented. The scheme of things may be further apprehended only by one skilled in the science and uninhibited in thought. That is not to say that the conditions required for research cannot be brought about by sound organization. What is required is the bringing together of good minds in an atmosphere of collaboration with the spice of professional competition. With enough resources to finance necessary investigations, virtually no limit can be set on what may be achieved.

There are many people who are learned in specialized fields of knowledge and who occupy themselves with utilizing this information for specific purposes. These are the technologists, the engineers, and the applied scientists. Whereas the physiologist will be concerned with the search for new information, the practicing physician actively applies known facts and technics to the alleviation of people's ills. Among the technologists, many are extremely valuable members of society, and the United States is particularly blessed with a large and competent corps of applied scientists. While we are not particularly outstanding in pure science, our technology is unsurpassed. With the opening up of new fields of knowledge, Americans are very quick to find applications, and each year new professions are created and new types of useful employment provided as an outgrowth of research. To mention a few examples, we manufacture synthetic materials such as rubber, nylon, and T.N.T., which were developed as a result of chemical research. Such products as penicillin, D.D.T., and streptomyacin came out of biochemical research. Recent physical research yielded many weapons during the war but also provided the knowledge for the aeronautical, automotive, moving-picture, and radio-television industries. The

processing of agricultural products is a steadily growing industry, as is the utilization of the products of mines, forests, and oceans. These developments form a sound basis for a healthy economy and insure the wealth and well-being of our people. Science has changed human life profoundly. The application of knowledge has vastly increased the population of the globe and for each man has provided comforts, dispelled misery, and prolonged life. Long hours of hard physical labor, for centuries the lot of the working man, have largely disappeared thanks to technology more than to labor unions.

EDUCATION

The good teacher is one who has acquired much of the accumulated wisdom of the race—exercising discrimination in what is important and what is somewhat less important—and transmits it undistorted to posterity. It is he who illuminates the Tapestry of Knowledge.

The gathering of scientific knowledge is, after all, an esoteric pursuit, and only those who have much specialized training are in a position to contribute significantly. The educational system, while providing limitless scope for the gifted, must also somehow instill in each individual the knowledge required for living in a technological age. A child should leave school with a vivid appraisal of the world and its institutions, so that he can assume and carry out with wisdom his responsibilities as a citizen of a civilized, democratic nation. It is also important that he be in possession of useful skills and knowledge so that he can be economically self-sufficient.

Each generation of new-born children finds itself in a more complex society and a more mechanized environment. Each generation has to make a more intricate adjustment than the last from the simple animal life of infancy to adult responsibility. This evolution can be made only through education, and perhaps the task is becoming really more than traditional education can handle. The lag of social behavior behind scientific knowledge is becoming more alarming daily. In many countries, for example, the people have given up hope of operating the complex functions of governing themselves and have yielded up their liberty and dignity to authoritarian control. Not that tyranny is new in the world, but true democracy appears to be on the decline. Where vast and complex technical operations of peace or war are involved, central authority and responsibility is the only means by which such projects can be managed. What the informed citizen of a modern democracy must not relinquish is his role as a policy maker! By combining what he knows with that of his fellows, he is the most competent authority in the world. It is a clear obligation of education sufficiently to inform each individual that he will make decisions on the basis of adequate information. Each man, like the skilled executive, may be trained to base his actions on the simple formula of Science:

$$\text{FACTS} + \text{LOGIC} = \text{DECISION.}$$

One cannot be patient with any notion of teaching in which solid subject matter is not the necessary and sufficient ingredient of an adequate education. Educators have been known to attempt to condition the young to approved attitudes, but such attitudes will not be sustained unless nourished by facts. For success, also, the atti-

tudes must be logically indicated from the information at hand. It is not sufficient merely to enjoin this or denounce that. Plenty of accurate information is indispensable in order to know what to do about such questions as racial discrimination, strikes, communism, birth control, divorce, sex education, crime, automobile accidents, international relations, business cycles, housing, alcohol, unemployables, insanity, poverty, and many more. These are the very questions which we must face today, and our children tomorrow. On the whole, they are not difficult and subtle questions such as those of modern physics, but they have many ramifications. They are amenable to a straightforward scientific attack according to the above formula. To assemble the truth and to screen out irrelevancies are the major problems. To disseminate the facts, I submit, remains the challenging job for education.

Truth and justice are cherished by most people. That they are not respected by all men is also a datum of our experience, and we govern ourselves accordingly. On the assumption that we want to determine the truth and see justice done, the problem of race intolerance, for example, may well start with the assumption that such manifestations do not occur without cause. It will probably be found that the causes are rooted deeply in economics. Whatever they are, honest research will disclose the causes. What democratic people require are not predigested opinions, but facts, unless education is to deteriorate into mere propaganda. We may depend on well educated people armed with facts and the technic of logic to pursue a wise and just course in each situation. The truth is often very hard to determine, as many interested parties weight the evidence and introduce conflicting points of view. The science of man requires the use of great skill in collecting the facts and the basing of decisions only on overwhelming evidence.

It is a duty of the teacher to monitor the information he transmits and to resist fiercely the introduction of propaganda of any sort into the schools. The educator alone stands between the susceptible minds of the children and the nightmare of calculated misinformation abroad in the world. The good judgment and integrity of the teacher thus are paramount; he must, in these respects, be comparable to the research scientist.

The tendency in recent years, especially in the secondary schools, to reduce the emphasis on factual material, I believe to be a serious mistake. It is not enough to know that the knowledge exists. One must have reservoirs of specific, accurate information in order to think fruitfully. Survey courses are better than no information at all, but they are part of the trend toward superficiality so depressing to witness today.

The teaching, as such, of religion in the public schools is not a feasible project because there is no body of doctrine which all thinking people agree should be made the basis for human behavior. Yet the lack of this element in training leaves a void in personality which poses a challenge to education. In its simplest conception the problem is one of character building—to train individuals habitually to exercise self discipline and to hold themselves to high standards of competence and responsibility. A democratic society can flourish only if it is made up of men who value personal honor, freedom, and dignity and are worthy of these possessions.

There appears to be more wrong with secondary education than with either primary or advanced professional education. The average person would have lost

little in subject matter had he gone directly from grammar school into college. Beginning college courses must start with such elementary information that in most instances a primary-school education is a sufficient prerequisite for doing the work.

Whereas in the elementary school and in the university, the teachers on the whole have an adequate command of their subject matter; this is probably not so true in the high schools. I believe the deficiencies in secondary education are largely traceable to this cause.

The subjects of competence and compensation of secondary-school teachers may well be reviewed at this point. As it now stands, it may not be unfair to state that society is receiving about what it is paying for—but it is not paying or receiving enough. This should not be construed to reflect unfavorably on many competent and conscientious teachers, but it does imply that there are certain fundamental faults in contemporary secondary education.

Many scientists believe that it is largely irrelevant to measure high-school-teacher competence by the years of training received in a college of education. Such institutions have an understandable but unfortunate tendency to value too highly their own wares, and in each state they work for legislation requiring large numbers of professional education courses as prerequisites for teacher certification, whereas I suggest that it would be more profitable for the teacher to spend this time in becoming proficient in the subjects to be taught. It appears reasonable to establish as of first importance for a teacher's competence that he be a master of his subject matter. Only by being informed adequately is he able to discriminate in his teaching between science and pseudo science or between material of primary and of secondary importance. By this I mean that our children have a right to expect instruction in carpentry only from highly skilled craftsmen, and in chemistry only from able professionals. When such teachers are in the schools they have a right to demand compensation in proportion to their skill, training, and ability to teach.

Too many teachers stand before a class in intellectual nakedness with little to offer the malleable young minds, which could be exceedingly fertile and receptive if stimulated and fed with clearly valuable and palatable information. A good teacher commands respect and admiration by his own character and grace of deportment, and for his obvious mastery of his subject. Immature people who themselves have just come out of school and have had little seasoning and few of life's experiences do not make good teacher material. It probably would be well to limit high-school-teacher certification to people over thirty years of age who have had several years of experience doing and living the things which they must teach to others.

A teacher can kindle aspiration by his personal love and enthusiasm for his subject and by the manner in which he elaborates in all their subtlety and precision the grand and beautiful concepts of science and the priceless gems of literature.

I received instruction in German language and literature from such a teacher and have never forgotten the experience and even retained some of the German. I was taught mathematics under the most dismal circumstances of teacher incompetence, where the instructor was barely ahead of the students in the textbook. Only later, happier experiences in mathematics developed in me an appreciation and love of this fine and exacting discipline.

It is well known that an adolescent boy or girl can handle very difficult subject matter if given access to it and provided with incentive. In European secondary schools, for example, much of the subject matter of American liberal arts colleges is taught, but there is an early elimination of those who would fail ever to master the material. This aptitude segregation should take place in the early teens. Those who are not capable of doing abstract work waste their own time and that of the teachers and impede the progress of those who are able.

Whatever his special aptitudes, however, the aim in our education should be to make of each individual a "whole" person. The education of most people terminates at the age of eighteen or before. At this age people marry, establish homes, bear children, and support themselves. By this time education should have provided certain things as an irreducible minimum. The three R's are part of these, and the primary schools usually do this part of the task satisfactorily, but much more is needed to make an adult citizen. This is the point where secondary education somehow does not accept the challenge. For a satisfactory life, at age eighteen each individual should be possessed of all of the following, and the only certain method of providing them is for the schools to accept the responsibility:

1. To have a good working knowledge of human physiology, the common diseases of man, the down-to-earth problems of child bearing and infant care, and practical and detailed sex education.
2. To have skill and competence in at least one craft or job at which the individual can make a living in competition with other men.
3. To possess social and physical skills including dancing, swimming, driving an automobile, and perhaps operating a typewriter.
4. To have gained practical legal and financial information necessary for owning property and for household and business management.
5. To write and speak the English language gracefully and precisely.

Society has failed a young person if he reaches maturity without complete instruction in these matters, and every secondary-school curriculum should provide for them. Other subject matter on the curriculum may well consist of elective cultural material or specific pre-professional training.

In regard to the merit of a specific subject on the curriculum: if it was taught a hundred years ago and will certainly be taught a hundred years from now, it is a part of human culture and should be retained. On the other hand, when the pragmatic and realistic student asks "What can I use this for?", it behooves the educator to ask himself what, indeed, is the item in question doing in the curriculum. If it passes the test it should not be eliminated, but the flux of human events carries us on, and we must continue to cull from our schools vestigial, anachronistic material to make room for subjects vital to mid-twentieth century life.

Teacher selection is usually in the hands of a local school board, the members of which are generally among the finest of the local citizens. These people, however, should be in possession of better indices of the teacher's worth than they now can obtain. Efficiency standards should be established, and the teachers periodically rated. This rating should be carried out on the one hand by professors of the subject matter they teach, and on the other by the senior students in their classes.

More uniform standards throughout the various states also would help the teaching profession. It is certainly to be hoped that teachers themselves will take the lead in eliminating complacency and establishing high qualifications for themselves, so that eventually they will match the competence and compensation of other professions currently more distinguished. The difficulty of this task, of course, should not be underestimated.

Toward Catastrophe or Utopia?

There have doubtless been astounding improvements brought about by technology in our way of life. If one boarded a navy plane at Washington in the evening and were transported non-stop to San Francisco while he slept, as I have been on a number of occasions, he might be particularly impressed with the transition since the time of the '49ers. In spite of spectacular changes in transportation, and in other phases of our lives, there remains a profound pessimism, a feeling that progress in the sense of improvement in the human race is wholly illusory.

There is before us evidence of barbarism as ugly as any in history. The greatest of all evils, and the source of all evil, ignorance, is still at large. Whereas the power of knowledge should be the boon of all men, there is the prospect that it may be perverted to the downfall of modern civilization. We have passed through minor crises of this nature, but the decisive events of the future probably cannot be put off long. The advent of exceedingly powerful weapons has made the situation so unstable that within the lifetimes of many of us, the final appalling show-down may occur.

The coming world events will be decisive, but they could be peaceable. Somehow we must circumvent the ultimate barbarism, the utter degradation of civilization, which might be the result of another war. Education here and abroad may be instrumental in bringing this about.

In approaching future events the educator requires a policy on which to base his actions.

He may well adopt both the short view and the long view. The short view apprehends that the first law of life is self preservation. Our children are informed ill if they have not learned that the world is a savage, insecure place and that great power and potent weapons may fall into the wrong hands. We should be quite naïve if we did not take steps to safeguard our heritage and our very lives.

The long view perceives that the only stable solution of our problems with other peoples is the creation of a united world, the components of which have relinquished their sovereignty. If a community of men ever can be brought about (surely only through enlightenment and reason) in which personal freedom is insured, and want, fear and pain are not the lot of the average man, then in truth Browning may say:

> "How good is man's life, the mere living! how fit to employ
> All the heart and the soul and the senses forever in joy."

THE CHALLENGE OF OUR TIMES TO EDUCATION AND RESEARCH

RAYMOND B. ALLEN

NEVER in history has man experienced the challenge, the opportunity, the epic responsibility for the achievement of noble ends of human welfare and human betterment that has come to our generation. For centuries, men of the western world have moved to the measure of the thought and action of the ancient Greeks of the Age of Pericles, the law and order of the Romans, the inspiration of the religious prophets, particularly of Christianity, and the humanists and poets of all time. Since antiquity, men, humble men and the great of mind and heart, together have dreamed of an enduring peace and well ordered society in which they might seek and find some degree of happiness. But to this very day their dreams, this noble hope, have perished in the flames of war.

Why is this so? For many reasons but chiefly, I think, because until our times men have not had the means whereby they might achieve unity of spirit, morality, and political objectives. How could men learn to understand one another and exchange goods and services without our modern systems of communication, transport, and mass production, We learned to use these systems during the wars of this century on a scale undreamed of hitherto and, in doing so, achieved some degree of unity among the allied powers. Out of this war-born unity has grown the determination to create the social and economic conditions everywhere from which a durable peace may grow. Modern technology is the material means by which men may yet realize their age-old dream and hope of peace.

The science and technology, the knowledge and skills, the power available to man today, capable of supplying all the needs of men everywhere, has been created largely by man's ingenuity and rational intelligence during a short fifty years: but a moment of time in the life history of man on earth. Little wonder, then, that the economic and social systems men have created falter at times and that there are recurrent crises of maladjustment of the technological machine to the social process of distribution of goods and services. The significant thing is that for the first time in history there is evidence that the technological and agricultural machine has sufficient resources and power to meet all the basic needs of men everywhere—for food, clothing, shelter, communication, and transport. Yet, today, over half the people of the world do not have enough to eat; many have inadequate clothing; and, even in our own country, many lack proper housing.

This, then, is the challenge and the crisis of our times: can man's ingenuity and productive ability be employed with the same efficiency for the constructive purposes of peace as for the destructive purposes of war? Not since

the Golden Age of Greece have historical currents been subject to such influences as are at work today, influences which can change the whole course of human destiny for the betterment or the degradation of mankind. The race is between the spirit of man and the machine, between education and the chaos and anarchy of war. There is good reason for hope that man is acquiring the social consciousness, the wisdom, and the appreciation of human and spiritual values to inspire him to harness the machine in the service of all men everywhere. The task is difficult, for it is nothing less than the harnessing of raw nuclear energy. To our generation has come the miracle of the transmutation of atomic matter to energy. The explosion which dramatized this event brought death and ruin with it and ended a war. But the explosion did not end the unsolved problems which created the conditions leading to war. These remain. A durable peace will have been won when men are able to create a social and economic system which will readily absorb the products and services of an always expanding technology for the benefit of all and the tyranny of none. This is the challenge of our epic times to education and research.

What can be done about it? First, we must continue to seek truth wherever and in whatever company it may be found and to disseminate truth by every means at our command. In this quest we must have as much concern about the social sciences and the humanities as about the natural and biological sciences.

For fifty years and more our colleges and universities contributed greatly to the creation of our industrial, scientific, and technological age. Skilled personnel focused their energies on the material needs of society and the individual and, in doing so, created the highest standard of living in history. In the process, however, our quest of human ideals has been all but obscured by our devotion to things, creature comforts, and false values. What is needed is a better balance in our research efforts. We need to apply ourselves just as vigorously in the field of the social sciences (which concern inter-personal relationships and the adaptation of the individual to his social environment and the social process to his needs) as we apply ourselves to improving the industrial machine itself.

Advanced education in colleges and universities, adult education generally, in fact, education at every level—university, common, and secondary school—is going through a period of growth and development in which objectives, methods, and techniques are being reexamined, and the programs are being adjusted to the requirements of the times and of tomorrow's world. This state of self-inquiry is a healthy and exciting condition for those who have the responsibility for instruction, administration, and research, as well as for the governing bodies of educational institutions, both public and private. Education, of course, is not a segmental process. It is continuous. The significant improvements that will be made in education and training in collegiate institutions will be no greater than the benefits which will flow to liberal and professional education from the improvements now taking place in the elementary and secondary-school systems of the state.

Among those experiments, none is more significant than the approach to community and democratic living by emphasis on the social aspects of school activity for children. By this I mean the learning of the process of happy adjustment to one's fellows of whatever race, creed, or color. When this job is well done in the common school system, there are few problems of social adjustment that can arise.

The habit of tolerance and consideration of the rights and ideas of others will have become so ingrained that it cannot be uprooted. I am convinced that the problem of adjustment of the individual to the social process and the parallel problem of education for individual achievement do not come in conflict in any well balanced educational program. The eminent Cardinal Hayes once said, "No nation, no people, can long endure in peace and safety if racial and religious hatred and class bitterness set at naught Christian brotherhood." To eliminate such prejudices is a job for the schools as well as for the churches. It also is a job for each of us in our homes and in our own families.

Have we done all that we can do in the post-secondary school levels, including adult education and extension services, for education for social responsibility and citizenship as well as for achievement and advancement of the individual? I believe *NOT*. And that is the number-one problem of higher education. The problem is generally recognized, and numerous experiments are in progress in many institutions.

In any list of problems will be one which is of transcendent importance if the greatest national resource of our country is to be developed fully. This is the identification and encouragement of the gifted individual, gifted in terms of intellectual, moral, and spiritual capacity. The loss today of this national asset is nothing short of staggering although the waste of human resources is much less than it was before the war, because of the federal subsidization of education under the G. I. Bill of Rights. It is a fact that a high percentage, varying widely among states, of students in high schools who demonstrate capacity of a high order fail to go on to college. Sometimes this termination of education is inevitable, but often it is preventable. If we mean that America provides an open door to opportunity for all of its youth, then opportunities for higher education must be open to all, not merely to some, qualified students.

Often, a potentially superior individual may seem to be quite ordinary and common in his attributes as a youngster. The maturing process varies widely among individuals. Environment, the home, community, and all the influences that come to bear upon the individual have an important effect. Equally important, however, is the latent capacity of the individual which the stimulus of the environment has not brought to light. Unfortunately, the reverse is also true. It is the business of education to be forever alert to detect latent capacity which may indeed lead to superior performance and leadership at a riper age. The common man, so-called, may become the uncommon man of the future.

This brings me to a third problem of higher education, adult education. By this, I mean influences which may come to bear upon any adult who is not taking formal schooling. Here, of course, we think of the press, the radio, the moving picture, service clubs, community forums, university extension, and organized adult-education programs. That colleges and universities must identify themselves vigorously with this problem and need goes without saying. Such adult education has been recognized for years and was mentioned even in the Declaration of Independence of Texas on March 2, 1836, in the words: "It is an axiom of political science that unless a people is educated and enlightened it is idle to expect the continuance of civil liberty or the capacity for self-government."

Another problem of higher education is that of general education. This is the central, unsolved problem of contemporary liberal and cultural education. I should like to quote here an excerpt from a report by the Committee on the Restatement of the Nature and Aims of Liberal Education to the Commission on Liberal Education of the Association of American Colleges:

> "Men and women are liberally educated to the degree that they are literate and articulate in verbal discourse, in the language of the area, in the symbolic language of Science; informed concerning their social and spiritual environment and concerning their relationship thereto as individuals; sensitive to all the values that endow life with meaning and significance, and able to understand the present in the perspective of the past and the future, and to decide and act as responsible moral beings."

That liberal education, so conceived, today falls short of this ideal in many of our institutions of higher education, there is no doubt. But this ideal can be achieved if this central problem is analyzed and the proper curriculum arrangements, particularly in the lower division work of our colleges, are properly made and supervised.

I do not like to play on words, but I digress here to point out that the word training does not necessarily mean education, and that wisdom does not necessarily follow education or training. We consider a man trained who has attained a requisite standard of conduct or skill by protracted and careful instruction and practice. Education, however, is, according to Webster, the systematic development and cultivation of a man's natural powers. Wisdom, of course, is the power of true and just discernment. Thus, education and training give merely a foundation for wisdom.

I believe that one of the most difficult aspects of the problem is that to provide such education for our students, we must first educate ourselves. Oliver Wendell Holmes, writing as the Autocrat of the Breakfast Table, declared that: "A child's education should begin at least 100 years before he is born."

The crucial question in this age of ultra specialization is whether men can learn to talk intelligently and understandably to one another across the barriers of technical jargon which separate them one from another. A man who really knows his subject can make it understandable to any intelligent person in the vernacular of the day. Too few specialists make this effort. The effort must be made if we are to achieve cultural and spiritual unity comparable to the already achieved technological and material unity throughout the world. Time and space have been eliminated as factors in world social and economic intercourse.

The relationship of general and liberal education to professional, vocational, and specialized education in such fields as engineering, mining, business, medicine, forestry, the law, and many others, presents another problem to educators. At the vocational and professional level dealing with specialized subject matter, it has been demonstrated in some fields that it is possible to introduce related subject matter of a broadening and general cultural character at the same time that students are gaining information and skills leading toward professional competence. This is a contribution toward an education which looks toward social responsibility as well as individual proficiency.

Closely related to this problem is the distinction, sometimes invidious, which is

often made between so-called applied research and basic research. Generally, basic research is regarded as any research which looks for new knowledge for its own sake, whereas applied research is that research which seeks an answer to a practical, immediate problem. Both are important, and the importance of applied research for a university—research in industry, business, and government, among many fields—is that it is possible to deal with principles and fundamentals at this so-called applied level and, as we learned during the war, to uncover new basic principles through approaches which were essentially practical in their nature at the beginning. Applied research will always be as good as the skill and integrity of the research worker and no better. The applied research which survives as useful is that research which never seeks to find the merely desired or preconceived right answer, but seeks only to find what is true. Basic research always seeks only what is true for its own sake.

Scholarship and research interact favorably with practical affairs of any community, and no can can say where scholarship ends and practical affairs begin.

The great strength of a state university lies in the fact that it makes no distinction between its own welfare from a scholarly point-of-view and the welfare of the community. Indeed these are inseparable, and the university or the college which isolates itself from affairs of men that look toward human betterment is headed for extinction.

By no means the least problem is that of financial resources of a university, that is, the question of budgets, the where-with-all by which the university's activities are supported. Money does not solve problems, but it supports men who can solve problems and provides facilities with which they can work. Once the American people understand the needs, they will not permit their institutions of education to struggle along on budgets which have disproportionate relationship to the wealth of the economy generally. Once they realize higher education's role in the preservation of the social system which we prize and understand the tremendous contribution education made toward turning back the threat of tyranny twice in our generation, it is inconceivable that liberal support will not be readily forthcoming.

Idealists will sacrifice much for the sanctuary of the university and college. They cherish what it stands for, and a grateful community will insist that such men and women are provided conditions of comfort and dignity in which to live and work.

The last problem is one common to all men and women who have any concern for the future of our country and of civilization as we know it. The age of specialization has produced a technological machine which bids fair to obscure if not extinguish human values. Our quest of human ideals in a material age has been obscured by our devotion to things, creature comforts, and false values. The race is between the machine and the spirit of man. Whether man has the social consciousness, the wisdom, and the appreciation of human and spiritual values to bring the machine under control in the service of all men is really the only problem.

The venerable Chinese philosopher, Wu Ting-Fang, put it this way: "The more a man is educated, the more it is necessary, for the welfare of society, to instruct him how to make proper use of his talents."

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SCIENCE AND EDUCATION FOR PEACE

EUGENE RABINOWITCH

IN THE past, nations have been governed by soldiers, philosophers, churchmen (such as Richelieu), historians (such as Thiers), or even artists (such as Paderewski), but never by men trained in natural science. Benjamin Franklin is the rare example of a man of scientific background who has acquired at least a certain prominance in his country's political affairs.

1. The Need for Scientifically Trained Personnel in Public Life

It has rapidly become commonplace to state that we live in a scientific age. To ensure the proper national and international administration and utilization of the vast powers which science has given to man and to prevent the destruction of our civilization by misuse of these powers are the foremost political problems of our time. That is not to suggest that science should replace law as the normal educational background of our statesmen and politicians but that it would be for the good of this country—and the same applies to other countries as well—if legislative bodies and public officialdom included at least a sprinkling of people thoroughly trained in pure and applied science.

When the questions of atomic energy came up for discussion in Congress, scientists were alarmed at the thought that no Senator or Representative could be expected to possess the knowledge of the underlying scientific facts—such as the distinction between nuclear and electronic phenomena—and therefore be trusted with correct appreciation of the military and political implications of atomic power. "Primers" in nuclear physics were hurriedly prepared and distributed among Congressmen but how many legislators have used them?

On one occasion when the international control of atomic power came up for discussion in the Senate Committee on Atomic Energy, two Senators disagreed violently, one obviously overestimating the importance of "denaturation" of fissionable materials as a method of making atomic power plants "safe"; the other calling this procedure a "hoax." The question is by no means academic—an intelligent approach to it is essential to a wise decision as to whether large atomic power plants can be left in private or national hands without danger to peace. A modicum of understanding of the scientific facts (such as familiarity with the concept of isotopes) would have provided the two Senators with a common background on which to base their judgment. In the United Nations Atomic Energy Commission, almost the only progress so far has been achieved in the Scientific and Technical Subcommittee, in which the presence of physicists and technicians, taking part in the discussions together with diplomats, has rapidly provided a considerable area of understanding as to the basic facts of the situation. After the severe jolt which the cause of international control of atomic energy suffered in the open discussion before the political forum of the Security Council, it was rapidly referred back to

this Subcommittee. If scientists and engineers were fully entrusted with this all-important problem, they would perhaps not promptly produce a universally acceptable solution; but at least much misunderstanding and shadow-boxing would be eliminated. No deadlocks would have arisen over such dummy issues as the dismantling of existing atomic bombs—as if they could not be re-assembled on short notice! The legal background of our statesmen and diplomats and their lack of scientific training naturally cause them to overestimate the importance of such legal questions as the use of the veto in the punishment of violators, at the expense of such questions of substance, as whether atomic power plants are important, whether they could be kept under control by inspection, or whether international management is necessary to prevent such plants from becoming a menace to peace.

To the assertion that scientists and engineers (assuming the latter do not represent private interests!) have a common ground and could agree on controversial political and international problems more easily than could politicians, it is often answered that when scientists (or other experts) are asked to give their opinion, they are often found to disagree violently among themselves. This criticism—which was often heard in the newspapers in connection with the political activities of American Scientists in the last two years—is based on misunderstanding as to the scope and methods of science. It takes a man with a certain understanding of science to formulate problems in such a way that a scientist can answer them. Laymen—for whom a scientist is a kind of a minor prophet—usually asks questions which scientists are not able to answer *as scientists;* but, for profit motives or because of a desire to be helpful, often try to answer anyhow.

2. An Educational Task

To make possible an intelligent utilization of science and technology for the public good and permit the full use of the advantages of scientific methods in arriving at national and international decisions, what is needed is not only that some scientists be transformed into politicians and public officials, but, most of all, that politicians and public officials (and public-minded citizens in general) acquire a certain understanding of the basic principles, working methods, and possibilities of science. To provide basic general education in science is an important task of our educational system. At present, science is studied mostly as preparation for certain technical professions. Those who go into commercial, legal, or political fields soon drop from their minds as unnecessary ballast the science they had learned at school. Of the remainder, the majority consider their scientific training merely as a set of tools given to them to solve practical problems which they may encounter in life and thus to advance in their professions. Only few, even among those who become academic scientists, are imbued with what we may call the "spirit of science," the belief in scientific principles and methods as basis for their general attitude in social and political life. Many a good scientific worker becomes completely irrational and unscientific when asked to give judgment outside his narrow field of specialization.

The teaching of science in our schools should be directed not only towards the communication of facts and skills which might prove useful to future chemists, doctors, or metallurgists but towards implanting in future generations an under-

standing of the basic principles of science, of the usefulness of the scientific method in solving problems, and of the basic human values inherent in this method, which make it applicable to situations outside the narrow technical fields. We need to educate, not a generation of scientists, but a generation of Americans fit to live in the "scientific age."

3. Science versus Technology

Principal obstacles preventing science from taking the place it should occupy in the minds of Americans are the confusion of science with technology, of discovery with invention, and the widespread misconception that Edison was a great American scientist, that science consists in building new gadgets or inventing new processes for the attainment of such definite practical aims as flying faster, curing tuberculosis, or making bigger and better bombs.

Science, in its purest form, in which it has the most fundamental and universal importance for man, is the quest for knowledge for the sake of knowledge. Without being blind to possible practical applications, the true scientist does not let them interfere with the direction of his quest. This quest is a probing in the dark and therefore essentially aimless; whenever the scientist works with a definite aim in mind—such as making an atomic bomb—he is an engineer and not a scientist. Combination of humility in the face of the endlessness of the unknown into which he is probing with the readiness to venture into this unknown and the consequent realization of the temporary and relative character of all present-day knowledge, concepts, and beliefs, are the basic ingredients of scientific attitude. Expanded into social and political fields, the same attitude should make for refusal to believe that any institutions or political theories are sacrosanct and unchangeable and should promote open-mindedness and tolerance.

4. One Science in One World

To nature there is no difference between nations and creeds. A scientific problem, whether explored by a white man, a Japanese, or a Negro will yield the same results. Communists have tried to establish a difference between bourgeois and proletarian science; the Nazis, one between Jewish and Aryan science. Both attempts were ridiculous failures. There is only one science, as there is only one nature. The internationalism of science is not a historical accident. Secrecy and suspicion (generated by war and now extended into peacetime) can disrupt the international cooperation of scientists but cannot "nationalize" science. Even "compartmentalized," to use the ugly military term, the scientists all over the world remains members of one team, working towards the same aims. A man in Japan, Germany, or Russia working in the same field as I, photosynthesis by green plants, is not my enemy, not even my competitor, but my co-worker. Every progress he makes is my progress; every new fact he discovers helps his colleagues in America as much as it does his friends in his own country.

This denial of national exclusiveness, this feeling of unity and spirit of cooperation of all nations, is another ingredient of true scientific attitude which the teaching of science should help to implant in students.

5. Respect for Facts and Readiness for Judgment

A scientist can get nowhere, in the long run, by twisting or ignoring facts, by making statements which are not confirmed by tests, or insisting that he is right after the tests made by others do not support him. Respect for facts, readiness to be judged by others and to accept their judgment are essential elements in the make-up of a scientist. No force and no propaganda can make right out of wrong in science. A scientist must be able to criticize himself severely, because, with each publication, he exposes himself to criticism by others, a criticism which no friendship, national solidarity, or economic interest can mitigate. This is the attitude which scientists should—and the best of them do—also bring into the discussion of social and political problems. The teaching of science in schools and colleges could implant this attitude not only in *all* scientists but also in future civic leaders and statesmen. Such changed attitude is needed to avoid the tragic paradox of civilized mankind's being unable to use its achievements except for its own destruction because of refusal to renounce obsolete political and social concepts even in the face of facts which clearly prove them to have lost their former rationality and usefulness.

To conclude, with the advent of the "atomic age," two new tasks have arisen for our educational system. In the first place, it must provide for an increased dissemination of scientific *facts,* prepare a greater number of scientifically competent men and women to be scattered through different trades and professions, even those where scientific training was unheard of in the past. In the second place, and what is vastly more important, education must communicate to the new generation some elements of true scientific spirit—the feeling of an essential unity and solidarity of all mankind, tolerance for other people's opinion, respect for facts, and readiness to submit oneself to criticism and to be judged by the test of unprejudicial experiment rather than to seek success by force and craft and acclaim by propaganda.

The danger of a material and spiritual collapse of our Greco-Judeo-Christian, urban, technological civilization is acute. We cannot expect the present leaders of the nations to create anything better than a temporary patchwork of peace. Even at that they may fail, and the next generation may find itself, before it has had time to grow up, one third dead, one third crippled, and one third destitute, roaming over the ruins which were once our cities and lifeless, radioactive plains which were once our grainfields. But if reasonable and skillful leadership succeeds in avoiding the catastrophe of another war in this generation, it still will be the task of generations to come to convert the precarious temporary peace structure into a permanent stable edifice of a world community of law. The preparation for shouldering this responsibility seems to me the foremost for the educational task forces of our time.

"The intellectual stimulus accompanying great upheavals, however they originate, finds expression in unusual achievements in science."

George Ellery Hale (Quoted in *Science,* Feb. 21, 1947)

WILL THE SCHOOL ADMINISTRATOR MEET HIS UNPRECEDENTED RESPONSIBILITIES?

CHARLES GLEN HASS

IN 1947 we are living in the second year of the atomic age. We have seen the tremendous power inherent in a weapon which ended a war within a matter of days after its power was used against our enemy. We have seen the force of its destructive power at Bikini. We are told that the bombs which have been used were firecrackers compared to those that surely will be available in the near future. We hear of other new destructive weapons of warfare. These developments require a new kind of conduct on the part of mankind; they require that adults and children see new meanings in the environment in which they now live, and that they learn social techniques to deal with them. If we do not learn these techniques, a time worse than the Dark Ages lies ahead of us. These facts constitute a preeminent challenge to school administrators.

Arms and armaments can no longer protect us. How can we secure international cooperation? Geographical isolation, secrecy, and intolerance do not provide even a Maginot Line. How can we develop communication and understanding in the world? What can be done to eliminate the sovereign power of nations to make war? How shall we control international aviation? How can we protect democratic liberties, such as the consent of the governed, when we develop new world concentrations of power? What sort of agency shall we set up which will exercise the full power of world government in its sphere—the control of atomic energy? How can we change the minds and hearts of men so that they will intensify their allegiance to a local community, region, and nation, and at the same time will have a binding loyalty to world citizenship? These questions and problems are a clarion call for action by public-school leaders.

Will the future historian write that mankind fought yet a third world war rather than adjust social outlook to environment? Or will he write that, in the ten-year period following 1946, educational and other leaders began systematically, through the process of education, to develop the kind of conduct necessary to live in this age?

In 1947 most American school administrators *profess* a philosophy of education which makes democratic human conduct the most important outcome of education. This philosophy has as its chief objective developing the kind of conduct which produces desirable, democratic ends in life. Knowledge is thought of as valuable in so far as it contributes to the development of behavior conducive to a democratic society. The difficulty is that philosophies on paper or those that are

carried around in neat compartments of the mind have little worth. To be of any value, a philosophy must be pragmatic; it must impel to action.

In *The Purposes of Education in American Democracy*,[2] the Educational Policies Commission has stated that the schools neglect one of their duties when they fail to promote the general welfare by reducing the lag between social institutions and human needs. If this charge be just, it becomes the duty of educators, as suggested by the Universities Committee on Postwar International Education, "To develop in individuals a sense of membership in the world community and a loyalty to the international organization, as the political institution representing the unity of mankind and serving the common interests of the people."[5]

It seems clear that what is most needed on the international level are those minimum essentials of democracy outlined in *The Purposes of Education in American Democracy*:[2] an interest in the general welfare of others; respect for the moral rights and feelings of others; the consent of the governed; the appeal to reason; and a reasonable opportunity through success and failure for each individual and state to secure happiness. These minimum essentials cannot be attained if each individual or nation builds its action on an attitude of "I'll respect your moral rights and feelings *after* I am sure that you are respecting mine; I'll be interested in your general welfare only *after* you have demonstrated time and again that you are placing a premium on mine." The United States of America, as the world's most mature powerful democracy, should have the best understanding of these principles of democracy and may have to take the leadership in cooperative action to make society safe in this period. It is not suggested that power be abdicated without proper safeguards; it *is* suggested, however, that all human development is based on the more mature individual giving a helping hand in the development of the immature.

The school administrator must clearly recognize that he is faced with a tremendous responsibility in a world society which possesses atomic energy and which has not outlawed war. This is not the only responsibility facing school administrators, but it is certainly the most far-reaching one. The weight of the problem must be borne particularly by the school administrator because it is he who has the greatest opportunity to do something effective about it; it is he who can provide leadership for the building of the kind of curriculum experiences with children and youth which will develop the democratic conduct which is necessary in the atomic age. Not only does he have the opportunity and duty to give leadership in the development of such a program with children, but he has the same responsibility with reference to the adults in his community. The public school, close to the hearts of the people, is the logical place for the development of a community program for world citizenship. These are responsibilities which no leader can lay aside lightly.

To develop his program to implement world citizenship, the administrator must start with himself and his staff. The principal and the teachers, cooperatively, must analyze the needs of both world society and the children with whom they deal. Out of this study of sociology and psychology they must formulate their philosophy, aims, and methods for developing conduct patterns essential for the survival and the progress of the world community. To be successful they must not

be the sort of educators who believe that aims should be stated at the outset of an enterprise and that their function has then been served. This group philosophy must be pragmatic; it must change what happens in the classroom.

Just how much change is necessary will depend on what has been happening in these classrooms. It is clear, however, that world citizenship cannot be developed overnight; it will be a total theme about which to organize the twelve years that each child is seeking formal education. Because of the compelling importance of the development of world citizenship and understanding, the total curriculum must be organized around the basic social functions of mankind: production, distribution, transportation, conservation, recreation, education, and government. The problems which arise out of these human activities will be studied in accordance with the maturity level of the child: children in the primary grades, experiences in areas closely related to home, school, neighborhood, and community; in the secondary school, community, state, region, nation, and the world community. As early as possible in the elementary school and throughout the secondary school, emphasis will be placed on developing behavior which will enable children and youth to participate in the elimination of cultural lag. Further discussion of this type of curriculum organization may be found in Caswell's *Education in the Elementary School,*[1] in *Democracy and the Curriculum,* which is the Third Yearbook of the John Dewey Society,[3] and in *Social Education,* which is the report of the 1938 Stanford Education Conference.[4]

The public school principal fails his duty in the development of democratic conduct if he does not practice democracy in school administration. Democratic living in the classroom is next to impossible without the favoring environment of democratic living in the whole school. Teachers who may not think for themselves can scarcely be expected to stimulate others to think. Cooperative thinking, planning, and management must exist if the school is to contribute to effective world citizenship. Respect for the personality of each individual teacher and child must exist. Within the framework set up by cooperative action, each teacher and child must have the opportunity to express creative interests and abilities. Both the children and the teacher must participate in the management, maintenance, and operation of the school plant, the school services to the community, and the instructional program as well. Each school must become a contagious illustration of the highest level of democratic living. The school administrator cannot easily shirk action demanded in the interest of society.

Another responsibility of each public school and its principal is to assist the adults in the community to understand the profoundly altered circumstances in which we now live, to aid them in gaining the knowledge, attitudes, and ideas which harmonize with the present world reality. American adults are profoundly disturbed by the present world situation. For the most part, however, they lack the necessary leadership to do anything constructive about their concerns. In every community there are undoubtedly service clubs, parent-teacher organizations, and planning committees which would respond quickly to a shared leadership in the study of what must be done to attain world citizenship and security, while retaining loyalty and pride in nation, state, and local community. The problem is one which can be solved only by educative processes, and public-school administrators and

teachers should provide the initiative and coordinated effort to develop world citizenship. The local community and the world community need the leadership of the public school.

To develop world citizenship in students the school needs the community. Children must participate in the solution of community problems if they are to learn about them and how to solve them. The school staff and students must seek educative problems and projects in which they may participate. Elementary-school children may aid in home improvement, improvement of recreational facilities, care for less fortunate persons, and beautification of school grounds. Secondary-school students may participate in planning and executing many projects for community improvement. In a rural area this work might involve agricultural improvement; in the city it might concern health or safety. If children do not have responsibilities concerning the improvement of the groups to which they belong, they cannot develop the kind of conduct necessary for world citizenship. The alert teacher and principal will find opportunities for student participation in community problems on the world level through conservation of food in time of world famine or through assistance to children faced with unusual problems in other countries. It is the responsibility of the public-school principal to develop community citizenship in order to develop world citizenship.

In 1947, then, the task of the school administrator is to make pragmatic his philosophy of education which places a premium on democratic human conduct; to lead his teaching staff in the development of a philosophy based on the sociological requirements of world citizenship and the psychological needs of individuals; to create with the teaching staff a curriculum which will progressively develop active, constructively participating world citizens; to establish the environment necessary to the success of this curriculum pattern through democratic school administration; to give leadership in the school community in developing the knowledge, attitudes, and ideas which are necessary for security and progress in the world community; and to develop a community relationship which will enable school children to participate in the solution of community problems and thus begin to learn the techniques and habits necessary for solving problems at all levels of group activity—local, regional, national, and international. The accomplishment of this task is the most significant problem which has ever faced educators as a group. They can do no less than give their best all-out effort to its accomplishment.

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LAY LEADERSHIP IN PUBLIC EDUCATION IN THE ATOMIC AGE

LYLE STEWART

THOSE two dramatic days in August, 1945, which brought hostilities in World War II to a speedy end, were an earth-shaking demonstration of the power of an industrial society. Ripping away at the wrappings of the secrets of the cosmos itself, modern man reached his highest technical level. Unfortunately this high advance in scientific and technological knowledge, aside from its fearful potential power for ultimate destruction, is accompanied by creaking and friction between interdependent groups of specialists. Industrial strife, conflict between workers and management, and even between management and stockholders in vast corporations, is one of the by-products of a specialized and interdependent modern life.

A recent issue of one of America's leading news magazines[1] carries the story of the unique effort of a large corporation to bridge the gap between the stockholders and management. The article pointed out "most big U. S. corporations are so widely owned that stockholders and top management are complete strangers to one another." The president of the organization, according to the article, conceived the idea of "establishing a chummier relationship," turning the thousands of stockholders into active business boosters for the wares of the firm. To this end a series of regional meetings was held throughout the nation, to which stockholders were invited and where they were treated to ham, cheese, roast beef, chicken sandwiches, and the product of the corporation.

Corporations logically may expect from their stockholders a favorable psychological attitude toward the services or products of the company. Perhaps because of this, they have taken unusual pains to inform stockholders of activities and plans for the future. Few have gone to the point or organizing stockholders' teas, but most aggressive and alert managements have supplied stockholders with attractive brochures and carefully prepared analyses which have been so well done as to make even the small stockholder feel that a large retirement annuity for the officers of the corporation is of personal benefit to him, as a stockholder, even, or that the passing of a dividend is an advantage to him. Because stockholders have a financial stake, management is correct in assuming a deep psychological interest and has played upon it through thoughtful and sometimes quite expensive public relations programs.

In spite of the example of business enterprise in capitalizing on a psychological predisposition, public school systems have, for the most part, not attempted extensive programs of public relations. Perhaps no other agency, public or private, has so good a reason to expect public interest and good will; for the schools serve the people's most prized possession, their children. Public interest and concern are

[1] *Time* March 17, 1947, page 85.

below potential because of relatively feeble public relations effort. Unfortunately, public relations programs which are officially maintained by school systems are limited in scope. Publicity by teachers' professional organizations too often is prepared for the consumption of the members themselves and is not designed as a means of informing the general public. For example, many of the teacher organizations feel it desirable to publicize organizational success on behalf of teacher welfare. This is of interest as personal news but does not build public interest in the school system.

One of the most frequently employed avenues of public relations is the release of news stories, many of which are reports of different children's activities, doings of teachers or other staff members, and athletic and other organized student activities. In addition to news stories, informative articles and editorials appear from time to time bearing on some aspect of the educational program. When controversial issues arise, particularly those involving finances, members of the profession are at some disadvantage, for, being paid staff members, they are targets for criticism on the ground that they are selfishly concerned and hence their publicity, however good, may be regarded as comparable to the testimony of a prejudiced witness in court.

One source of power in public relations has been too little employed on behalf of public education throughout the nation. The State of Washington has been something of a pioneer in this field. School support in the state has not experienced the sweeping changes which have occurred in its financial structure by any accident. Through most of the years of its history, the state made relatively modest investments in the operation of its schools, and for the most part its schools were little better supported than the average of other states. During the last fifteen or sixteen years it has forged steadily ahead to the point that it now ranks among the top three or four states in the nation in the adequacy of its support and in the equalization of funds provided to the relatively poor communities. Significantly, this has paralleled the growth of a unique organization or alignment of organizations. The late John B. Shorett, long time member of the Seattle School Board, 1929 to 1945, with the support and understanding of his colleagues on the Board, labored to interest school directors in a state-wide organization to assume responsibility for over-all leadership in legislation and educational planning. The idea took, and individual board members throughout the state have given much time and must have borne considerable personal expense to carry on their activities on behalf of schools. Some dozen or more years ago Mr. Shorett, as a delegate to the State School Directors' Convention, proposed a unique organization to be known as the Allied Committee of Sixteen to consist of five school directors representing districts of the second and third class, five representing districts of the first class, and five representatives to be chosen from the Washington Congress of Parents and Teachers, the State Superintendent of Public Instruction to be ex-officio, the sixteenth member. This committee was charged with the responsibility to coordinate and make effective the legislative interests of the public schools. The purpose of the committee was to sell to lay leadership, that is, to school directors and leaders of the Parent-Teacher movement, their responsibility to take an active part in influencing legislation and in other public relations matters. In spite of the criticism

and even outright opposition on the part of some of the members of the teaching profession who felt that teachers should be represented on the Allied Committee, the founders of the organization steadfastly held to their purpose of maintaining it as a lay group and pointed out to those members of the profession who questioned this policy that by remaining a lay group the committee would be far more influential.

The years of experience have proved the wisdom of this point of view. For example, in the practical problem of supporting proposals for public schools before the Legislature, school directors and parent-teacher members are able to represent the interest of public education with no charge that they are serving their own selfish ends. Representatives of teacher organizations, however, obviously face criticism that they are simply another lobby, seeking funds for their own selfish ends. School directors, however, are public officials in whom their own communities repose unusual confidence. Receiving no salaries, Board members are able to urge the cause of education free from taint of personal advantage. Parent-teacher leaders likewise are able to promote the interests of public education without such criticism.

The only claim which the State of Washington has to being unique in this matter is that it is the only state in which the State Congress of Parents and Teachers and the State School Directors' Association are working in a coordinated and regularly organized manner.

School children have no vote. In Washington they have had a powerful champion in the organized and united efforts of school directors and parent-teacher workers. Leadership in the Allied Committee has always stressed the importance of developing wider participation by lay leaders, not just to the end that such an organization would become a powerful force in legislation, but that it would become an interpreter of free public education and would encourage the widespread study of educational problems. Lay leadership must become informed as to the needs of children and young people and be able to help plan programs which will be effective and best serve them. The control of free public education should rest according to American tradition in local communities. This local control will be good to the extent that it is informed. No one can question the depth of interest which the community has in its children and in its public schools. They are its chief agency for child welfare. Many lay individuals in Washington State, motivated by the educational needs of children and inspired by one-anothers efforts, have devoted many hours of personal time to studying the problems of education. Their task will continue to be a two-fold one: first, to provide thoughtful and aggressive leadership in moulding school policies to conform to community needs and desires; second, to organize and exert influence to the end that the means are found to make "ample provision for the education of all children without distinction or preference. . . ."[2]

Washington is no longer a pioneer state, remote on the frontier of America. By the very power of the atomic age America is no longer a pioneer people removed by oceans from the fears and troubles of a foreign world. As has been said so many times, there must be one world or no world. UNESCO points the way in its "Since wars begin in the minds of men, it is in the minds of men that the defense of peace must be constructed." Education is so huge a task that it can not be provided for one world by the teaching profession alone. Lay support and active lay leadership are imperative.

[2] Washington State Constitution.

INTRODUCING NOMINEES

NINETEEN FORTY-SEVEN is an election year for Pi Lambda Theta. The nominating committee, consisting of Harriett V. Batie, Myrtle S. Burns, Mary Ellen Marshall, Mabel Claire Stark, and Ann Aikin, Chairman, presents the following nominees: Dr. May V. Seagoe, president; Dr. Alice Hayden, vice-president; Kathryn E. Steinmetz, third vice-president; Katharine Pease, fourth vice-president; Katherine Clarke, fifth vice-president.

Dr. May V. Seagoe, Associate Professor of Education at the University of California at Los Angeles, is known to all Pi Lambda Thetans. Dr. Seagoe, as president of Pi Lambda Theta (1945-47), has shown judgment, tact, and organizational skill that have made an invaluable contribution to the growth of the organization. Dr. Seagoe was born in California. Her wide and successful professional experience is reported in the October, 1945, issue of the Pi Lambda Theta JOURNAL.

Dr. Alice Hayden, Associate Professor of Educational Research and Director of Educational Research in the Department of Education at the University of Washington, received her B.S. and M.S. degrees from Oregon State College in 1929 and her Ph.D. degree from Purdue University in 1932. An account of Dr. Hayden's professional career and her membership in professional organizations can be found in the March, 1947, issue of the JOURNAL.

Miss Kathryn E. Steinmetz is now Principal, Pasteur School, Chicago. She has held the principalships of three elementary schools in the last twenty years. She has been a member of the Curriculum Bureau for Science, director of a social center, and a member of many city-wide educational committees. Initiated in Lambda, she helped found the Chicago Alumnæ Chapter and has taken a great deal of responsibility in it as president and as program chairman.

Miss Katharine Pease is the Editor of the Graduate Record Office of the Carnegie Foundation for the Advancement of Teaching. Biographical information about Miss Pease can be found in Pi Lambda Theta JOURNALS for October, 1946, and March, 1947.

Miss Katherine Clarke is another representative of an alumnæ chapter. St. Louis Alumnæ suggested her because of her broad knowledge of Pi Lambda Theta, her excellent contributions to the local program, and her reputation as an author and practicing educator. Katherine Clarke was elected to Theta chapter of Pi Lambda Theta while a student at the University of Iowa in 1927. She earned her A.B. there in 1931, her M.A. in 1933. She was a delegate to the Council held at Troutdale and has served as president of both Theta Chapter and St. Louis Alumnæ. At present Miss Clarke is principal of Meramac School, Clayton, Missouri, and an instructor at Woman's College, Washington University, St. Louis.

FIFTEENTH BIENNIAL COUNCIL

THE Fifteenth Biennial Council will be held from Sunday, August 10, through Wednesday afternoon, August 13, at Reed College, Portland, Oregon. Any interested member of Pi Lambda Theta is welcome at Council, and many will doubtless wish to combine Council with a vacation in the Pacific Northwest. Much of the time will be given to work groups and their reports in Council regarding the work of the Association for the coming Biennium.

Rates for non-delegates will be $2.00 per day for the room, 50 cents for breakfast, 75 cents for lunch, and $1.25 for dinner. The swimming pool will be open for our use.

In addition to chapter delegates, who are being contacted individually, we should know as soon as possible who will be present. If you think you can attend as a visitor, will you fill out and mail *both* forms immediately to the national office, 405 Hilgard Avenue, Los Angeles 24, California? One form is for the use of the Committee on Arrangements, and the other is for use in the national office in planning the program. The deadline for receipt of reservations is *AUGUST first.*

Transportation to Council

Delegates to the Biennial Council to be held in Portland, Oregon, who will travel through Chicago, will find the route of the "Portland Rose" the most direct. This train leaves Chicago at eight fifteen in the evening on the Chicago North-

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VISITOR'S APPLICATION FOR ROOM RESERVATION
FIFTEENTH BIENNAL COUNCIL

Name .....

Permanent address .....

Address until August 7 .....

Mode of Transportation .....

Day and approximate hour of arrival .....

Day and approximate hour of departure .....

If you wish to room with a particular person, please give her name .....

.....

.....

Western and continues west from Omaha on the Union Pacific. This train, which carries tourist accommodations, arrives in Portland on the third morning at six thirty.

Delegates coming from the South will find the Texas and Pacific to El Paso and the Southern Pacific from there the most direct route. The "Beaver" from California carries tourist sleepers. From northerly points, both the Northern Pacific and the Great Northern have direct connections into Portland via Seattle.

Because of the necessity of keeping transportation costs to the minimum consistent with comfort, travel allowances are made on the basis of tourist accommodations where these are available. This is true for most points west of Chicago. Because passenger agents have no assurance now that their present schedules will be in effect in August, a suggestion of a possible schedule will be sent each delegate after the middle of June.

Dress for Council

The Committee on Arrangements for the Biennial Council consists of Mrs. Evelyn Reed Powell, 3727 N.E. Flanders, Portland 15, Oregon, as Chairman, Shannon Pettinger, and Edna Hollenbeck. In view of the fact that, for the last three years, the temperatures in Portland during August have averaged a low of 59° to a high of 79°, higher temperatures are possible but not probable.

The Committee suggests that visitors bring one or two thin dresses, sports clothes or suits, one street-length afternoon dress, a lightweight topcoat, and comfortable walking shoes. An umbrella and toe rubbers might not be amiss. In keeping with the informal tradition on the college campus, we will dress informally for dinner and long dresses will not be needed.

INFORMATION FORM FOR COUNCIL VISITOR

Name .....

Address until August 7 .....

On what days will you plan to attend meetings? (All the time? Part time? What days? August 10-13) .....

.....

Of what chapter are you now a member? .....

What chapter offices have you held? .....

What previous Councils have you attended? .....

What is your position or vocational status? (Graduate student, housewife, etc.) Please give title and employer if employed .....

.....

In what aspects of Pi Lambda Theta activity are you especially interested? .....

.....

RESULTS OF BALLOTS ON CONSTITUTIONAL AMENDMENTS

BY MARCH FIFTEENTH, the necessary two-thirds affirmative votes had been received by the executive secretary from the sixty-three chapters to assure passage of both amendments to Pi Lambda Theta's constitution. The amendment increasing the size of the National Board by two additional officers received fifty-two affirmative ballots and one negative vote. The nominating committee has notified chapters of the nomination of Katherine Clarke of St. Louis and of Katharine Pease of New York for these two additional offices.

The amendment increasing the life membership fee to forty dollars, in proportion to the increase in annual dues adopted by the last Council, passed with forty-seven affirmative and seven negative votes. The increase is effective immediately. Instalment payments for life membership may be made for four years, ten dollars a year. The advantages of life membership are three-fold: (1) national membership and receipt of the JOURNAL for life; (2) assurance that three-fourths of the fee goes for publications, loans, and other long-term uses, all constructive activities; and (3) dividends in added loyalty to the association.

RESIGNATION

MISS VIRGINIA SAHS, National Executive Secretary of Pi Lambda Theta, is resigning as of June 30, 1947. She is being succeeded by Mrs. Geraldine McPhillips Johnston.

Pi Lambda Thetans have enjoyed their contacts with Virginia and appreciate the fine service she has given the organization.

Pi Lambda Thetans wish you the best of everything, Virginia!

ERRATA

The March issue of the JOURNAL carried, on page 118, a quotation "Time for Everything," author unknown. Martha A. Youngs informs us that the author is Thomas Curtis Clark.—The Editors.

"The ultimate responsibility for our nation's policy rests on its citizens, and they can discharge such responsibilities wisely only if they are informed."

H. D. Smyth, *Atomic Energy, The Official Report on the Development of the Atomic Bomb,* 1945

HAVE YOU READ?

MUMFORD, LEWIS, *Values for Survival,* Harcourt, Brace, and Co., New York, 1946

This book contains two groups of essays, one on politics and one on education, and a group of letters written between 1938 and 1946. A common thought threads through all the essays—the anticipation of things to come (and many of these things did come). In the essays, Mr. Mumford also tells of the struggle of the past and the even greater struggle that is ahead.

The first essay in the book, "Call to Arms," was published before Munich, but Mr. Mumford tells of the danger which America faced at that time. In the "Making of Men," the author, who is a teacher and educator, outlines the changes which education must undergo in order to deal with the forces of disintegration which were in existence long before the atomic bomb. "Program for Survival" deals with the implications, political and moral, of the atomic bomb.

The "Letters to Germans" were addressed to five citizens of the Reich. In these letters, Mr. Mumford reviews aspects of German thought which Americans must understand if they are to avoid the blunders made at the end of the First World War.

HAWLEY, GESSNER G. and SIGMUND W. LIEFSON, *Atomic Energy in War and Peace,* Reinhold Publishing Corporation, New York, 1945

The first part of the book is given over to explanations of the atom: neutrons, energy transformations, combustion, explosions, radioactivity, transmutation, nuclear fission, and other subjects related to the atom which are of fundamental importance. The middle section of the book is devoted to the official War Department report of the atomic bomb project, of the great obstacles that had to be overcome, and of the manner in which they were surmounted. The last section deals with the future military, social, and industrial uses of atomic energy.

The authors' watchword when writing the book was "essential facts only." The authors have succeeded in explaining this new force and its uses in a simple, clear manner and with as little detail as possible. Only the first act in the tense and exciting drama of atomic energy has been seen. New developments are occurring each day. The authors plan to cover these happenings in future editions of this book.

DUNN, FREDERICK S.; BERNARD BRODIE; ARNOLD WOLFERS; PERCY E. CORBETT, and WILLIAM T. R. FOX, *The Absolute Weapon: Atomic Power and World Order,* Harcourt, Brace, and Co., New York, 1946

The authors of this book are members of the Yale Institute of International Studies. The chapters they write are the results of discussions among the entire group over a period of many months. However, each collaborator has formulated his own problem and drawn his own conclusions.

The book describes the nature of this absolute weapon, analyzes its effect on military science and international relations, and points to the direction the nations of the world must follow in order to find freedom from fear of this destructive weapon.

Frederick S. Dunn describes the common problem the bomb has given nations to solve which so far resolves itself into a paradox: "the best way to avoid atomic warfare is to get rid of war itself; the strongest present ally in the effort to get rid of war is the capacity to resort to atomic warfare at a moment's notice." He says the atomic bomb has wrought great changes in the military affairs of nations, in political relationships, and in the international machinery for peace and security.

Bernard Brodie describes the revolution the bomb will cause in the science of warfare. Arnold Wolfers and Percy E. Corbett outline the changes the bomb will make in the relationships between Russia and the United States and in all international relationships. William T. R. Fox weighs the possibilities and dangers of all types of control which have been suggested. *The Absolute Weapon* attempts to show the way in which thoughtful planning and intelligent statesmanship can meet the greatest challenge in all history.

DIETZ, DAVID, *Atomic Energy in the Coming Era,* Dodd, Mead, and Co., New York, 1945

Two questions are in the minds of many people today: What is atomic energy? What does it mean to the future of the world? In his book, Dr. Dietz attempts to answer these questions in language anyone can understand.

David Dietz tells about the long road to the discovery of this gaint force and how scientists all over the world contributed to its discovery. He describes the nature of the atom and outlines ways in which this energy can be used to benefit mankind in the future. He evaluates the impact this source of power will have on industry, transportation, and life in general. He sets forth some of the problems which the world faces today at the dawn of the Era of Atomic Energy. He tells why, in the due course of time, human life as we know it today will be revolutionized.

David Dietz is a trained scientist and a well-known lecturer in the field of science. The story of atomic energy is close to his heart for he has been writing and talking about the atom for twenty-five years. He brings to the reader an expert knowledge of what he says is the greatest scientific discovery of all times.

SWING, RAYMOND G., *In the Name of Sanity,* Harper and Brothers, New York, 1945

In his introduction to this book, Mr. Swing tells how after the use of the atomic bomb he devoted one broadcast each week to a discussion of the influence of the release of atomic energy in our time. He says, "I saw certain problems clearly. The atomic bomb had changed warfare and must change all social life. I recognized that I should have to discuss world government, since only through a world sovereignty could war be abolished and civilization be preserved."

In the Name of Sanity contains Mr. Swing's broadcasts and his "Americans United" speech. He uses political developments as a background as he traces the story of the bomb from Dr. Einstein's letter to President Roosevelt telling him about the discovery of "a new and important source of energy" to the establishment of the National Defense Committee, the statement of Oak Ridge scientists, and other developments down to the present.

Mr. Swing contends that world government is the only alternative to world suicide. He concludes by saying, "There must be law among nations as well as within nations. And there must be centralized power to enforce law. We can, of course, do nothing and let war come again. That will end it right enough. Or we can ordain a world of law. One way is death. The other way is life. One way is sanity. The other way is social madness."

BROWN, HARRISON, *Must Destruction Be Our Destiny?* Simon and Schuster, New York, 1946

In 1939, Harrison Brown began working on atomic energy research and in 1943 went to the Clinton Laboratories in Oak Ridge, Tennessee, as assistant director of research. Of this book, Clifton Fadiman says, "It is the most important book, in my opinion, you have ever published. It is certainly the clearest, calmest, most logical exposition I have encountered of what the atomic bomb has done and will do, unless we at once institute steps leading to a world government."

The author tells what the destruction of Hiroshima and Nagasaki means to the world. He then outlines the problem that faces us. We, as a country, cannot expect to keep the secret. There is no defense although Mr. Brown suggests possible defense measures. Supremacy in atomic warfare will have no significance. "World control of the atomic bomb, and this implies world government, is necessary if we are to avoid destruction."

Mr. Harrison tells about "An Unwritten Chapter" of the book. He says he had planned to conclude his discussion with an analysis of the potential benefits atomic energy might bring to humanity. But all considerations pertaining to peace seemed insignificant compared to the immediate considerations of life and death. He says we cannot hope that atomic energy will aid in the creation of abundant life until the danger of destroying life has been eliminated.

HAMILTON, ALEXANDER, JAMES MADISON, and JOHN JAY, *The Federalist*

Different generations have given special attention to different ideas in *The Federalist*. Until after the War between the States, it was referred to for ideas relating to national and states' rights. Since that time, it has been invaluable for its discussions on the increased power of the national government, the balance of activities within the government itself, and the development of new oppositions of interest and ambition. Today, it is being consulted for the parallel between its arguments in favor of the United States and the arguments lately put forth in favor of the United Nations. *The Federalist* was written at the time when people were concerned with the future of our national government, and we are living in the age when the great concern is pointed toward future international government.

A Short List of Articles on Atomic Energy

Johnson, Howard C. E., "Atomic Bomb By-products," *Scientific American,* December, 1946, page 261

Sutton, Richard M., "Transmuting Atoms and Men," *The Christian Century,* July 24, 1946, pages 914-916

"Planning Cities for the Atomic Age," *The American City,* August, 1946, pages 75-76

"Man Against the Atom—One Year," *Business Week,* July 6, 1946, pages 65-72

"What Congress is Doing to Solve the Problem of Atomic Control," *Congressional Digest,* May, 1946, Vol. 25, No. 5, pages 131-158.

"Atom Powered City," *Scientific American,* March, 1947, page 124

Gallager, Dr. Buell G. "Prometheus Rampant," *Vital Speeches,* December 15, 1946, pages 141-145

Nichols, Herbert B., "Atomic Power, How? When? *Christian Science Monitor,* Magazine Section, June 4, 1947, page 3

Hutchins, Robert M., "The Atomic Bomb Versus Civilization," *The Human Events Pamphlet,* December, 1945

"Atomic Energy Proposals," *The United States and United Nations Report,* Series No. 2, Atomic Energy Commission, June 14, 1946

Sarnoff, Brigadier General David, "Science for Life or Death," *Academy of Political and Social Science Pamphlet*

"The Atomic Challenge," Committee on Education for Lasting Peace, *Backlog for Action* (Women's Action Committee), October, 1945

Murphree, E. V., "Power from Atoms," *Popular Mechanics,* pages 89-93

"The Atom at the Crossroads," *New Republic,* September 16, 1946, page 310

MAE MCCRORY

"One conclusion that appeared rather early in the development of the theory of relativity was that the inertial mass of a moving body increased as its speed increased. This implied an equivalence between an increase in energy of motion of a body, that is, its kinetic energy, and an increase in its mass. To most practical physicists and engineers this appeared a mathematical fiction of no practical importance. Even Einstein could hardly have foreseen the present applications, but as early as 1905 he did clearly state that mass and energy were equivalent and suggested that proof of this equivalence might be found by the study of radioactive substances. He concluded that the amount of energy, E, equivalent to a mass, m, was given by the equation

$$E = mc^2$$

where c is the velocity of light. If this is stated in actual numbers, its startling character is apparent. It shows that one kilogram (2.2 pounds) of matter, if converted entirely into energy, would give 25 billion kilowatt hours of energy. This is equal to the energy that would be generated by the total electric power industry in the United States (as of 1939) running for approximately two months. Compare this fantastic figure with the 8.5 kilowatt hours of heat energy which may be produced by burning an equal amount of coal."

Atomic Energy, The Official Report on the Development of the Atomic Bomb

CROSS CURRENTS

One of the encouraging aspects of the present time is the concern of scientists for the sociological implications of the rapid advancement of technology. The following articles, reviewed briefly in this column, state points of view of three leaders in the field of science: a director of research for a private industry, a professor of bacteriology, and a college president.

HAS TECHNOLOGICAL DEVELOPMENT LED THE HUMAN RACE TO THE VERGE OF RACE SUICIDE? Does the great road of scientific development lead to destruction? Is science so unmindful of the effects of its work on society that it should be curbed or limited by some form of legislative regulation? Have we reached a point where we cannot go further because we cannot trust ourselves?

C. F. Kettering, Vice-president in Charge of Research for the General Motors Corporation in Detroit, says an emphatic "No" to all four questions in "The Future of Science," in the December 27 issue of *Science*. Mr. Kettering emphasizes that science has greatly accelerated human progress in all fields in the short 150 years that planned scientific research has been carried on. He believes that science will point the way to increased benefits to more people in the future. These are some of the developments which should be the result of the future policy of the American Association for the Advancement of Science:

1. Increased exchange of information among all groups in our society and hence increased cooperation. During the war, pure scientists, engineers, chemists, biologists, industrialists, and educators learned how to work together. The entire war effort was an example of the rapid advances in application that can be made only by cooperative effort.
2. A greater follow-through than at present from the conception of the idea to the experiment, to the device, to the product. Science will be advanced furthest when its results and problems are better known and understood. It is often just as important for the businessman, the lawmaker, and the general public to know of discoveries in the field of science as it is for other scientists to know of the technical details. The results of science must be made available to all peoples of the world in facts and not in prophecy.
3. Continued interest in the field of education. The advancement of science by its very nature implies education. The war proved the necessity of a population with a good educational background, from the research scientist to the operator of scientific equipment in the field. The scientist learned many new methods and developed many teaching aids which should be used in peacetime education.
4. The necessity for increased postgraduate study in this country for research workers, educators, and all scientists who work in creative fields. Science should look to the research laboratories of industry, of privately endowed institutions, of government, and of schools for future postgraduate work. The shops, the mines, the hospitals, and the hundreds of progressive organizations in our own country offer unlimited possibilities for advanced study.

Technological development need not mean race suicide. The present accomplishments should let men see how little human beings really know and what great opportunities there are for advancement. There is a limitless field; the question is how can humanity best use it. A factor that has never been accurately evaluated is the tremendous service rendered by educators during the emergency of World War II. Through the American principle of "education for everyone," the people of this country evolved the most widespread educational system in the world. During the recent crisis there were two things to fall back upon; first, the excellent basic education received by American youth and second, a knowledge of the procedure required to solve the problem—education experience. Today we know how successfully this program was carried out; our victories attest that. The public has not been too well acquainted with this point: IT WAS THE EDUCATORS WHO BROUGHT ABOUT THIS MIRACLE. People often express their gratitude for America's natural resources of coal, oil, minerals, land, and timber. Less often do they consider in their thinking the other great resources without which we could never have reached the position we occupy today among the nations of the world: the backlog of scientific knowledge, mass-production facilities, technical societies, and our educational system.

SCIENCE IS INTERNATIONAL. In "Programs for Medicine and Natural Health is the USSR," *Science,* March 14, Stuart Mudd, President of the American-Soviet Medical Society and Professor of bacteriology at the University of Pennsylvania, points out that science is international in its outlook and influence. Science—because of its emphasis upon the scientific method of investigation, upon dealing only with facts as they can be determined, upon sharing information toward further developments—is one of the roads by which peoples may travel to international understanding and cooperation.

The article discusses Professor Mudd's recent visit to Russia and his investigation of scientific study and research there. Among the interesting scientific activities observed were the myriad ramifications of the work of great Pavlov and his school. Pavlov made progress in the study of higher nervous activity and its relationships to mental health. Modern psychiatry rests to a great extent on the work of three men: a Russian, an American, and an Austrian. The importance of the emotions, and their effect on the biological organism, was brilliantly studied by Walter Cannon. The organization of responses and the conditions of learning were ingeniously investigated by Pavlov, in his studies of the conditioned reflex. The EFFECTS of conditioning or training, both parental and social, on the development of the human personality were the contributions of Freud.

Another development in the field of science is the Institute of Public and Communal Hygiene at Moscow. The Institute has nine divisions and twelve laboratories. At present, the staff is concentrating upon problems which have arisen in part at least through the stresses of the war:

1. Sanitary consequences of the war: (a) a re-establishment of Stalingrad; (b) dwellings in the re-establishment period; and (c) cleaning cities in periods of war and subsequent times
2. Acclimatization: (a) population in Arctic conditions—expedition to Dikson Island with a staff of three persons; (b) clothing and conditions in different climatic zones

3. Pollution of atmospheric air: (a) dust pollution; (b) bacteriological pollution
4. Pollution and self-purification of water
5. Sanitary indications of soil pollution
6. New sources of lighting and their sanitary purposes

Dr. Mudd stressed the eagerness of the Soviet scientists to have the members of the American party see, understand, and appreciate their work. He found the Russians far better acquainted with the technical literature of western Europe and America than our scientists are with Soviet material. He found that the Soviet scientists were aware of the tensions of the political atmosphere. Their attitude however, revealed their determination to abide by the conviction that the scientists' world is, indeed, ONE.

A GREAT NEED IN THIS COUNTRY IS A NATIONAL SCIENCE FOUNDATION WITH A SOUND SCHOLARSHIP PROGRAM. President James B. Conant, of Harvard University, in "A National Science Foundation," in *Science*, March 21, urges the support of the House of Representatives and of the public for a National Science Foundation. President Conant confines his remarks to the scholarship part of the proposed program because he believes it to be of the first importance. He says that we need a Science Foundation both to forward our domestic economy and to strengthen our military establishment.

Dr. Conant favors a scholarship program which would call for 6,000 scholarships annually awarded for four years to high-school graduates—a total of 24,000—and a total of 900 graduate fellowships. However, recognizing the need of keeping Federal expenses down, he recommends that a program of half this magnitude be tried out for five or six years and its results evaluated by Congress and the American people. He gives these reasons for his position:

1. The welfare of a free society in an industrial age depends on a continuous advance of science and the application of the new knowledge to useful ends.
2. Both the advance of science and the application of science to industry, to medicine, and to agriculture depend on the quality and quantity of scientists and engineers available in a nation.
3. The supply of men depends on the number of trained and the innate ability of those who undertake the special training.
4. The scientific professions in question require a long and expensive education beyond high school.
5. This education is of such a nature that it can be given at only a relatively few centers in every state.
6. Therefore, unless a student lives in one of these centers, his professional training must be costly for he must pay for room and board away from home as well as other expenses.
7. The consequent financial barrier now prevents many boys and girls of high ability from going on with an advanced education. Much talent is lost to the nation by this educational waste.
8. To right the balance, a federally supported scholarship and fellowship program is required.

The "Educational Pyramid" gives an over-all statistical picture of the present educational selection in the United States in that it represents the average for the

whole country. Starting with 1,000 pupils enrolled in the fifth grade (figures for earlier grades are confusing because of pupil retardation), the following figures show the extent to which they are reduced in each successive year:

Elementary school:

Fifth grade, 1930-31	1,000
Sixth grade	943
Seventh grade	872
Eighth grade	824

High school:

First year	770
Second year	652
Third year	529
Fourth year	463
Graduates, 1938	417

College:

First year	146
Graduates, 1942	72

There are many reasons why boys and girls drop out of school, but there can be no question that to a large extent financial considerations play a part. This is particularly true in regard to the drop from 417 graduates of high school (per 1,000 of fifth graders) to 72 graduates of college. To the extent that family finances are the determining factor, potential professional talent is lost for the service of the nation.

Dr. Conant says:

> "In all the discussion about research that goes on these days, an obvious fact is sometimes overlooked, namely, that it is men that count. And today we do not have the scientific man power requisite for the job that lies ahead. The bottleneck of our scientific advance is essentially a man power shortage, and unless something is done about it, the bottleneck will be more constricted a decade hence. Now let no one imagine that, like some of the man-power shortages in the war, this can be cured by mobilizing and training for a short time the first people who come to hand. Scientific and technical advances depend on quality as well as on quantity or, to put it another way, on the quantity of exceptional men. These men have to be located when they are young and then given a long and expensive scientific education. If the proposals before you become law and Congress appropriates the money, we will see a flowering of scientific work in this country the like of which the world has never seen before. For only in this Nation, where universal education reaches to the high school level, is it possible to locate the hidden reservoir of talent which, if tapped, can enrich our life and that of all mankind."

HIGH-SCHOOL STUDENTS WIN SCHOLARSHIP. The winners of the $2,400 Westinghouse scholarships in the sixth Annual Talent Search were presented with their awards at a banquet at the Hotel Statler in Washington, D.C. on March 4. The winners are Martin Karplus of Newtonville, Massachusetts and Vera Radioslava Demerec of Cold Spring Harbor, New York. Mr. Karplus plans to enter Harvard this fall as a premedical student. Miss Demerec will enter Swarthmore.

HELEN F. OLSON

PROGRAM NOTES

TODAY—more than ever before—the world is faced with the reality of the "race between education and catastrophe." Watson Davis, Director of Science Services in Washington, says, "This is no time for resting. The future is too urgent. . . . There is too much chance that the world in madness will destroy the civilization that has been evolved, such as it is." The same note of urgency is expressed by Ralph Strebel in his book, *Education—Keynote of Peace,* in the discussion of atomic energy: "It can be used in one of two ways—to bring about destruction of global life and property, or to open the way to the most abundant living the world has ever known. Which way will it be? Have we broadened that gap between our material and non-material cultural development to the point where it cannot be bridged in time to save us from impending doom? The forces of education must work desperately hard to inculcate those spiritual values in hearts and minds of the people that will make possible the use of atomic energy for constructive purposes."

The same theme is set forth by Robert Hutchins in the "Good News of Damnation" when he states that "Our hope lies in the processes of education at home and abroad." He goes on to demonstrate how tremendous is the job of instilling in Americans the spiritual values necessary for the fulfillment of their mission in the world today by giving examples of the disproportionate amounts of money people in high places are willing to allocate to peace and to war. "The budget of UNESCO, the United Nations Educational, Scientific, and Cultural Organization, which is supposed to bring peace through education, has been set at $6,000,000, something less than a third of the amount which the University of Chicago alone spent every year during the war on the development of new weapons of destruction."

That Pi Lambda Thetans are aware of their role in this world crisis is evidenced in the programs of the various chapters. There has been great stress on the acquisition of knowledge and understandings which will make it possible for them to play an active and intelligent part in promoting a better order of things. In some of the programs it will be noted that words were translated into action. UNESCO has been the most common theme for discussion during the year as may be shown in the following reports from program chairmen:

Alpha Epsilon—"With the UN in our front yard it is fitting that Alpha Epsilon Chapter should be very enthusiastic about including some international problem in our program for this year. . . . Our international project is: The preparation of an up-to-date bibliography for educators abroad who have been cut off from such information and the collecting and sending of books to teachers in devastated countries."

Alpha Beta Chapter—The purpose of the January meeting is "to gain a deeper understanding of the attempts to develop education through international cooperation. At this meeting we intend to concentrate on UNESCO. We are planning on having a panel discussion headed by some faculty member who has been active in the educational aspects of UNESCO. On the panel we are having persons who have had actual experience in education in various foreign countries. Through this we are hoping to gain an understanding of actual conditions existing in education in coun-

tries throughout the world. Out of this discussion may arise a Pi Lambda Theta project for aiding foreign education and teachers in a material way."

Toledo Alumnæ Chapter—Kathleen Lardie, Department of Radio Education in Detroit and UNESCO's representative, will be guest speaker and her subject will be "Our Share in UNESCO."

Indianapolis Alumnæ Chapter—"Education's Part in UNESCO."

Alpha Lambda—"Contributions to UNESCO."

Alpha Theta Chapter chose for the year's theme: the "Role of Women in the Atomic Age." The program indicates a concern with affairs within the country as a basis for meeting problems of the atomic age. From its rich personnel resource in Washington, the chapter planned a program which included many prominent speakers.

Washington Alumnæ Chapter—This chapter had two meetings designed to give the members knowledge vital to a better understanding of other countries. At one meeting three foreign students from the University of Washington spoke about their respective countries and at another, consuls from foreign lands will speak on their educational systems.

Pasadena Alumnæ Chapter—"We plan to investigate more specifically the needs of schools in devastated areas throughout the world. We expect this subject to consume our interest and energy over a period of possibly two years with the hope that we may later help materially in the problems of these foreign peoples. Speakers planned for the three meetings are: Mrs. Huang, a Chinese lady whose husband is a government official in China; two English exchange teachers who are located in our Pasadena schools; and a representative of the International Friends, a Quaker Organization whose members are working in devastated areas of Europe."

Northern California Alumnæ Chapter has concerned itself with International Outlooks. Its program has included talks on Holland by Mrs. A. HoostGraasland, wife of the Vice-Consul from Holland in San Francisco; Russia; Greece, by Mr. John Ross, formerly attached to UNRRA; Norway, by Mrs. Anna Sophia Ostvedt Stromnes, Norwegian patriot and student; and Italy.

Sigma Chapter has attacked a problem which is basic to global peace. This chapter has begun at home with problems of intercultural understanding with a program which included such topics as: Race Discrimination and the Christmas Spirit, Probing our Prejudices, Classics in Intercultural Understandings, and Workshops in Intercultural Understandings.

Delta Chapter delimited the scope of its program to "International Understanding Through the Arts," stating that "the arts furnish a common ground on which the peoples of all nations can understand each other without the hindrance of language differences."

It is evident from the above that Pi Lambda Theta has recognized the seriousness of the times and is attacking the many problems from many angles. It is speeding the cause of education in its race with catastrophe. It is answering the challenge of the President of the United States when he said: "If the civilized world as we know it is long to survive, the gigantic power which man has acquired through atomic energy must be matched by a spiritual strength of greater magnitude. . . . Only a high moral standard can master this new power of the universe and develop it for the common good."

VERNA WHITE

FROM COAST TO COAST

Portland Alumnæ Chapter

Members of the Portland Alumnæ Chapter are delighted that the National Board favored accepting their invitation to hold National Council in the "City of Roses" in August. They extend a hearty welcome to one and all.

A questionnaire circulated recently among members served as a source of information concerning positions, activities, and hobbies of each member for the chapter's newsletter. This publication contained, in addition, the president's message, a summary of chapter activities for the year, and short articles by members in which they explained the work they were doing.

The theme for the November meeting was *Future for Peace*. Dr. Maure L. Goldschmidt, Associate Professor at Reed College, was guest speaker. This was a joint meeting with Delta Kappa Gamma and Phi Delta Kappa.

Of special interest to members this year is the work of a cooperative project called "Christian Girls' International House," sponsored by Mary C. Harding. The nucleus is Mary, her mother, and four girls from Alaska. Girls of other cultural backgrounds who need a home while attending school or otherwise preparing themselves for leadership among their own people will be added, whenever any are found. The girls share in food costs and in household and garden work.

San Diego Chapter

The San Diego Chapter, under the leadership of Miss Annetta James, is continuing to work enthusiastically on the problem of teacher recruitment this year. They were delighted to have Dr. May Seagoe with them for their November meeting, when she talked on the opportunities for service in recruiting teachers. To each meeting high school and college students who are prospective teachers are invited to share friendship and advice. San Diego Chapter members are also trying to generate enthusiasm among beginning teachers and to encourage them to remain in the profession.

Alpha Theta Chapter

Chapter meetings for the year have been interesting and informative and were concerned with the following: "The Educational System and General Conditions in the Arab Speaking Countries," presented by Dr. Akrawi, Director of Public Instruction in Iraq; "What Women May Do in Relation to Juvenile Delinquency Problems Today," with Captain Rhoda Millikan of the Women's Bureau as speaker; "The New Program for the Education of Teachers in the School of Education," with Dr. James Harold Fox as speaker; "The Contribution of Women to Community Life," presented by Dr. Jessie Fant Evans, Member of the Board of Trustees, George Washington University.

Alpha Beta Chapter

The theme of Alpha Beta Chapter programs for the year is *UNESCO and Teacher Recruitment, Retention and Dependents*. Program topics include: "Scotland Today,"

presented by Miss Anne Murray, Wisconsin High School, exchange teacher from Daniel High School, Motherwell, Lanarkshire, Scotland; "UNESCO and Educational Developments among Nations"; "Problems of the Teaching Profession."

Chicago Alumnæ

Emphasis has been given this year to the problem of teacher recruitment. Professor Endicott, who is in charge of placement at Northwestern University, spoke on this subject at the January meeting. He said that the financial world presents the argument that the beginning salaries in business and industry for inexperienced graduates and the salaries of beginning teachers are comparable. According to Professor Endicott, the beginning teacher from Northwestern will start at a salary higher than that of the average beginning salary of graduates who are placed as engineers, accountants, and advertising men. While this comparison is favorable for the teaching profession, our real problem is not the beginning salary but the maximum salary of teachers, said Professor Endicott.

Central Ohio Alumnæ

At the suggestion of Pauline Bryant, energetic and dynamic president of Central Ohio Alumnæ, a most enjoyable dinner meeting was held in Columbus on January fourteenth. Members of twelve different honorary societies having some association with education participated in the event, each group being responsible for a definite task in regard to the program or the general arrangements. Represented at the affair were nurses, psychologists, students in music, fine arts, industrial arts, commercial education, and general education for men and women.

Miss Bryant introduced members of the various organizations and girls of Delta Omicron presented a delightful musical entertainment. The speaker for the evening was Dr. J. B. Edmonson, Dean of the School of Education at the University of Michigan, whose topic, "Looking Ahead in Education," was treated in a most interesting, optimistic, and straightforward style.

It is the hope of the chapter that a scholarship dinner will become one of its cherished traditions.

Alpha Nu Chapter

Dr. Nathaniel Cantor, widely known sociologist, writer, lecturer, and teacher, was asked to present his challenging ideas on teaching and learning to Alpha Nu Chapter at the University of Buffalo. With his first shocking statement that educators by and large had "missed the boat" and "were off the beam" he captured the attention and aroused the curiosity of those who had assembled to hear him. He then proceeded to describe an approach to learning which departs radically from the traditional method. As the student learns only that which satisfies a felt need and that in which he is interested, educators, says Dr. Cantor, must begin to use the findings of dynamic psychology, psychiatry, and mental hygiene. They must provide, as the nursery schools have begun to do, an opportunity for the students to learn by creative, active participation in work centered about the student's own interests and needs. When educators have done this, the students will be truly educated individuals capable of self-discipline, self-criticism, and self-motivation and willing to be responsible for their own decisions.

Those who heard Dr. Cantor's stimulating talk wished to learn more about his ideas and were eager to obtain and read his new book, *Dynamics of Learning* which further explains his ideas and applies the principles of social work in actual classroom situations.

Northern California Alumnæ Chapter

The chapter project committee presented a final report on its project to aid in the rehabilitation of devastated schools overseas. This project was initiated at the March, 1946, meeting, when members were moved to action by the stirring address of Dr. Lawrence Sears. Since then contributions have made possible the adoption of three schools, one in Arnhem, Holland, another in Namur, Belgium, and a third which is to be assigned by the headquarters of "Save the Children Federation," the agency through which contacts were made.

At the January meeting, members enjoyed the photographs of "their children" in Holland and the calendar the children had made for them.

In addition to these overseas activities the chapter helped provide a Christmas party for children in an underprivileged rural school in Missouri.

SUBCOMMITTEE ON SPECIAL PROJECTS

Friendship Kits

The Subcommittee on Special Projects is pleased to report that approximately one hundred Pi Lambda Theta Friendship Kits have been sent to teachers in Greece. In addition, several chapters have sent books to schools and libraries in devastated countries.

Among other special projects undertaken by Pi Lambda Thetans are: sending school supplies and books to Norway, sending food packages to displaced Poles in Germany, supporting a Belgian war orphan, contributing to the World Student Fellowship Fund, adopting schools through Save the Children Federation, and adopting a village in France. What splendid evidence this is that Pi Lambda Thetans are "working actively to further the cause of democratic education."

LAURA MCADAMS

INDEX

The Editor wishes to express sincere appreciation to Pi Chapter, Pullman, Washington, for its compilation of the Index for Volumes XXIV and XXV included in this issue.

IN MEMORIAN

Helen Frances Lewis

While serving as a librarian with the United States Army in Korea, Helen Frances Lewis died of pneumonia April 24, 1947. A graduate of Platteville State Teachers College and the University of Wisconsin, where she earned her M.A. in 1944, Miss Lewis was an affiliate of Alpha Beta and Washington Alumnæ Chapters of Pi Lambda Theta. During the past ten years, except for 1942-43, Miss Lewis made her home in the Pacific Northwest; she taught social studies in the Seattle Public Schools from 1944 until the time she left for Korea.

WOMEN IN THE NEWS

More than twelve hundred women in administrative and counseling positions in various fields—education, psychology, business, industry, and government—were present when the personnel workers of the nation assembled for their first convention since 1942, in Columbus, Ohio, March 28-31, to consider social, personal, and vocational problems of youth.

The Council of Guidance and Personnel Associations links together a number of groups interested in youth. Three major groups are: The American College Personnel Association, The National Association of Deans of Women, and The National Vocational Guidance Association. Other co-operating agencies with representatives in attendance were: The Alliance for Guidance of Rural Youth, The Eastern College Personnel Officers Association, The Institute of Women's Professional Relations, The International Association of Altrusa Clubs, The National Federation of Business and Professional Women's Clubs, The Western Personnel Institute, and Vocational Advisement Officers of the Veterans' Administration.

Representatives were present from China, South America, Canada, Puerto Rico, Mexico, and Hawaii. Mrs. Way Sung New, member of the Human Relations Commission of the United Nations Organization and Dean of Ginling College, was enroute to China for a five months' visit to attend a Dean of Women's Conference in China and to report to her government. Greetings were sent to the Chinese Deans via Mrs. New in a citation made at the closing luncheon of the N.A.D.W. Mrs. New will return to the United States in time for the next meeting of the United Nations and to complete her work on the doctorate at Columbia.

The Council of Guidance and Personnel Associations chose for its program theme the topic "Developing Human Resources of Democracy."

Dr. Lillian Gilbreth, noted consulting engineer and Professor of Engineering at Purdue University, spoke on "Human Engineering in the Atomic Era." She stressed the importance of intensive training for youth in cooperative management and the importance of world understanding as a basis for community of thinking. Mrs. Gilbreth entered industrial engineering with her husband and, after his death, successfully carried on their firm with one hand and reared their eleven children with the other. She is a distinguished American engineer who in her spare time has been active enough in the Girl Scouts to serve as chairman of their national board.

Another interesting personality who figured prominently in the deans' meetings was Dr. Irma E. Voigt, Dean of Women at Ohio University, Athens, Ohio. Dr. Voigt has long been active in women's organizations such as the League of Women Voters and the A.A.U.W. Of the latter, she is a former national president. She is now serving her thirty-fifth year in her present position. She was given an ovation at a dinner specially planned for her by Ohio Deans of Women.

Dr. Esther Lloyd-Jones, Director of the Guidance Laboratory and Associate Director of Personnel at Teachers College, Columbia, led a session on "What's New in Personnel Procedures?" for the American College Personnel Association. She introduced, among others, Miss Margaret Stephenson, Director of Student Life and Dean of Students at Pratt Institute, Brooklyn. Miss Stephenson, formerly Lieutenant Commander Stephenson of the SPARS, was Counselor of Women at Oklahoma University preceding her war service. The fact that a woman has been appointed to administer a personnel program in any institution where there are two men to every woman is worthy of notice. In many institutions, the office of the Dean of Women has disappeared and the leading administrative position, called the office of the Dean of Students or the office of the Director of Personnel, has been given to a man.

Dr. Katherine Blyley is the newly elected president of Keuka College in Upper New York state, a college accommodating 500 women. In recent years Keuka College has reorganized its curriculum along progressive lines somewhat similar to those in effect at Antioch. The College schedule has been arranged so that a student may secure practical work experience in several vocations. Following a period of work off the campus, students make verbal reports to their group and a written report to the faculty. Miss Blyley was a leader in the curriculum reform at Keuka.

Dr. Dorothy Stratton, following her war service as Commander Stratton of the SPARS, served in the U. S. Department of Labor as Special Assistant to the Administrator of the Retraining and Reemployment Administration. She is now Consultant on Personnel, International Monetary Fund, United Nations Organization. Dorothy Stratton is a Pi Lambda Thetan.

Dr. Ruth Brett, Dean of Women at Tuskegee, and Dr. Deborah Partridge, Director of Teacher Training at Tuskegee, both members of Pi Lambda Theta, are cooperating on a project concerned with the training of teachers in small villages in the South. Students work away from the campus for periods of three months.

Dr. Florence Thompson of Michigan State College in Lansing, Michigan, has recently completed a study of the use of the college residence hall as a laboratory for social experience for students. She advocates a much wider and more intelligent recognition of the residence situation as one in which student opinion and tastes can be influenced. Dr. Thompson did work at the University of Chicago.

Dr. Rosemary Park, academic dean of Connecticut College, has been appointed fifth president of the college, succeeding Dr. Katherine Blount, who retired last June. Dr. Park is thirty-nine years of age and comes to the presidency from the field of foreign language. She is the daughter of Dr. J. Edgar Park, who was President of Wheaton College, Norton, Massachusetts, 1926-1944. She was graduated summa cum laude from Radcliffe in 1928 and received her master's degree there the following year. She studied abroad at both Bonn and the University of Cologne, obtaining her doctor's degree from the latter magna cum laude in 1934.

Mrs. Jessie Field Shambaugh of Clarinda, Iowa, a school teacher in a one-room school, has recently been honored as the "First Lady of the Cornfields." Believing country children should be organized and that they should have their interests aroused by friendly competition, she founded Four H Clubs. There are more than 2,000,000 members of the Four H Clubs in the United States and the organization has clubs in England and in other countries.

"And How About a Woman for the Job?" asked a recent newspaper editorial. The editor had discovered that the President had suggested no woman member for appointment to the UN Commission on Atomic Energy. A reporter called on both Republican and Democratic Women's Divisions in Washington for suggestions. Mrs. Chase Going Woodhouse, Democratic Executive Director, suggested former Representative Emily Taft Douglas of Illinois; Oveta Culp Hobby, former commanding officer of the WACs; Josephine Schain, former chairman of the Cause and Cure for War; and Representative Helen Gahagan Douglas of California.

From Republican headquarters, Mrs. Robert Macauley, assistant chairman, proposed Claire Booth Luce; Mrs. Oswald Lord, former chairman of the WACs Advisory Committee; Mrs. Ruth Streeter, former director of the Woman's Marine Corps; Mrs. Mary Donlon, Chairman of the New York Workmen's Compensation Board; and "all the Republican Congresswomen."

"Don't say we didn't tip you off, Mr. President," concluded the newspaper man.

Joan Kain, newspaper columnist and home economist, a supervisor in the U. S. zone of Austria where she is working with the International Children's Emergency Fund, has returned to this country to plead for a new solution to the problems of children who are refugees in need of repatriation. The situation is acute because UNRRA, which is now responsible for orphaned children in Europe's devastated areas, goes out of existence on June 30, 1947.

Dr. Edesse Dahlgren, Rho Chapter of Pi Lambda Theta, received publicity in New York papers following the organization of the "Multi-Party Committee of Women" in New York City, a non-partisan organization of women to encourage the participation of women in politics and to oppose "back-room politics." She believes that both housewives and professional women should prepare themselves for politics, be informed regarding vacancies in appointive offices, and recommend able women for political appointment. Miss Dahlgren is a consulting psychologist in New York City.

Dr. Grace Morley, Director of the San Francisco Museum of Art, recently returned from three months in Paris, where she served as counselor on museums to the international secretariat of UNESCO. Miss Morley's job with UNESCO was to outline and initiate a plan for the development of museums as community cultural centers throughout the world. She covers a wide scope in the plan which she has outlined. Wartime mortality of scientific collections remains to be surveyed and is one of Dr. Morley's assignments.

LOUISE PRICE

OUR CONTRIBUTORS

SYLVIA VOPNI

Sylvia Vopni was among "Our Contributors" in the October, 1946, JOURNAL.

PAUL LEONARD

Paul Leonard, after receiving his A.B. from Drury in 1923, served as Principal of Reed Junior High School, Springfield, Missouri, for two years before earning his A.M. (1927) and Ph.D. (1929) at Columbia. While serving as Professor of Education at William and Mary College for eight years, Dr. Leonard served as educational consultant in Mississippi, Virginia, and Texas. In 1937, he was elected to an associate professorship at Stanford. He became Professor of Education at Stanford in 1945. Meanwhile, he served as consultant to several educational surveys in California and to the O.P.A. during the war period. Dr. Leonard was Director of the Consumer Division of O.P.A., 1943-44. Dr. Leonard is a member of the editorial board of *Scholastic Magazine, Building America,* and *Educational Leadership* and author, co-author, or editor of a number of books on education. Dr. Leonard is active in civic affairs in San Francisco where he now serves as President of San Francisco State College.

J. HAROLD ANDERSON

J. Harold Anderson was born in Washington of native parents. He received his LL.B. degree from the University of Washington in 1928. Mr. Anderson has practiced law at Cashmere, Washington, since 1929. He is married and has two children. During the war he was in the army as Special Agent in the Counter Intelligence Corps, detached for duty with the Manhattan Engineer District, and he received commendation from Major General L. R. Groves for "excellent work . . . during assignment to Trinity" and "handling security matters and maintenance of liaison . . . in connection with the test of the first atomic bomb on July 16, 1945."

THEODORE BRAMELD

Dr. Theodore Brameld is very well known in the field of educational philosophy. He received his B.A. from Ripon College, Wisconsin, in 1926 and his Ph.D. from the University of Chicago in 1931. He has taught at the University of Chicago, Long Island University, and Adelphi College and is, at present, Professor of Educational Philosophy at the University of Minnesota.

Dr. Brameld is active in many professional organizations. He is president of the Philosophy of Education Society for the year 1947; he has been chairman of the adult education committee, American Federation of Teachers, since 1943. He is a member of the American Philosophical Association, the John Dewey Society, and the International Council, New Education Fellowship.

Dr. Brameld is the author of numerous books and magazine articles.

WALTER H. BARKAS

Walter H. Barkas is currently Head of the Physics Section of the United States Naval Ordnance Test Station, Inyokern, California. He will soon transfer to the position of the Chief of the Scientific Section of the Office of Naval Research, San Francisco. His past professional experience includes positions as Assistant Director, University of Washington Applied Physics Laboratory; Senior Physicist, Thirteenth Naval District; member, The Institute for Advanced Study, Princeton, New Jersey; and Instructor in Physics, Columbia University. He received his Ph.D. in physics from the University of Washington in 1936. He has published many research papers, chiefly on the subject of nuclear physics, and for a number of years has been interested in Naval Ordnance development.

Recognition for Dr. Barkas' work includes his election to Fellowship in the American Physical Society, the receipt of a Naval Ordnance Development Award, and a citation from Admiral Christie. He is a member of Sigma Xi and Phi Beta Kappa.

Still in their early thirties, Dr. Barkas and his wife, Borghild, who was initiated into Pi Lambda Theta and Phi Beta Kappa while a student at the University of Washington, are the parents of two charming children, a boy and a girl not yet in their teens.

RAYMOND B. ALLEN

Dr. Raymond B. Allen assumed his duties as President of the University of Washington on September 1, 1947. The new president has an outstanding record of accomplishment in organizational and administrative work.

Dr. Allen was graduated from the University of Minnesota in 1924 with the degree of Bachelor of Science and then continued his studies through 1928 to obtain the Master of Arts degree and to complete the work for the Doctor of Medicine degree.

After internship in a Minneapolis hospital and practice at Minot, North Dakota, Dr. Allen returned to the University of Minnesota in 1930 as a Fellow in the Mayo Foundation to continue his studies. He was awarded the Doctor of Philosophy degree by the University of Minnesota in 1934.

From 1934 to 1936, Dr. Allen was connected with Columbia University as a member of the Faculty of Medicine, occupying the position of Associate Director, New York Postgraduate Medical School and Hospital, and Associate Dean in charge of Graduate Studies of the College of Physicians and Surgeons. He left Columbia to become Dean of the College of Medicine of Wayne University, Detroit, a position he held until 1939, when he went to Chicago as executive dean of the Chicago colleges of the University of Illinois. In 1941 Dr. Allen was given the duties of Dean of Medicine in addition to his executive direction of the entire group.

Dr. Allen is a member of Sigma Xi, Alpha Omega Alpha (medical honorary), Phi Delta Kappa, and numerous scientific societies. He has published widely in scientific and medical educational journals. At the present time he is vice-president of the Medical Center Commission of Chicago.

In 1931, Miss Dorothy Sheard and Dr. Allen were married. They have four children.

EUGENE RABINOWITCH

Eugene Rabinowitch is at present Research Professor in the Graduate School of the University of Illinois, Urbana, Illinois. From 1944 to 1946 he was Section Chief in the Metallurgical Laboratory at the University of Chicago, the branch of the Atomic Bomb Project in which the energy-producing uranium pile was developed and first used for the production of the man-made explosive element plutonium. Dr. Rabinowitch remains consultant to the Argonne National Laboratory at Chicago, the post-war successor of the Metallurgic Laboratory. The Argonne National Laboratory was established for research and development in all phases of atomic energy, including fundamental research in physics, chemistry, biology, medicine, and engineering; the development of industrial power; and research on military uses.

From the early "pre-Hiroshima" days, Dr. Rabinowitch took active part in the discussions of the political and social consequences of the release of atomic power. He was a member of the first executive committee of the Atomic Scientists of Chicago, and, since December, 1945, he has been one of the editors of the *Bulletin of the Atomic Scientists*, a monthly magazine devoted to the analysis of new developments in science in their relation to political, military, and social problems.

Dr. Rabinowitch is a physical chemist and has published numerous articles and several books in this field. He has carried out investigations in the field of reaction kinetics and photochemistry at the University College in London and, since 1938, at the Massachusetts Institute of Technology. Since 1939, he has been working on a two-volume monograph on photosynthesis, the first volume of which was published in 1945.

Dr. Rabinowitch was born in Russia and holds a Ph.D. from the University of Berlin (1926).

CHARLES GLEN HASS

Charles Glen Hass is at present serving as Administrative Assistant in the Horace Mann-Lincoln Institute for School Experimentation, Teachers College, Columbia University. He is on leave from the Denver Public Schools where he served as teacher and demonstration teacher, 1937-1942. While in military service in the army, he served as Chief of Training and Assignments, School Division, Headquarters, Ninth Service Command, 1944-1946. In this position he was in charge of academic training in ASTP and ROTC units in the eight far-western states. He was Classification Officer for the Army Specialized Training Unit at the University of Utah, 1943-1944. He has the Master of Arts degree from Stanford University and the Bachelor of Arts degree from the University of Denver.

LYLE STEWART

Mr. Stewart is Assistant Superintendent with the Seattle Public Schools, having been with the Seattle school district for tweny years. He has an A.B. from Simpson College, 1924, and a M.A. from the University of Washington, 1930. He now is a candidate for a Ph.D. from the College of Education, University of Washington. He has done University teaching during the summer months.

Mr. Stewart has two children, a daughter in the last year of junior high school and a son in the fourth grade.

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